DOCUMENT RESUME

ED 349 445 CE 061 953

TITLE Workplace Learning Curriculum Guides. Volume I: Basic Skills--Math.

INSTITUTION Colorado Community Coll. and Occupational Education System, Denver.

SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC. National Workplace Literacy Program.

PUB DATE 92

CONTRACT V1A98A1028191

NOTE 307p.; For other volumes in this series, see CE 061 952-960.

PUB TYPE Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01/PC13 Plus Postage.

DESCRIPTORS Adult Basic Education; *Basic Skills; *Budgeting; Classroom Techniques; Course Content; Literacy Education; *Mathematical Applications; *Mathematics Instruction; *On the Job Training; Pretests Posttests; Teaching Methods; Test Items

IDENTIFIERS *Workplace Literacy

ABSTRACT

This volume, the first of a series of eight curriculum guides compiled by the Colorado Workplace Learning Initiative: 1991-92, contains an outline of four workplace literacy courses: basic mathematics refresher course, mathematics in the workplace, mathematics skills for the workplace, and budgeting workshops for the workplace. Course outlines include a course overview, objectives, time frame, materials, homework assignments, teaching outlines and suggestions, course content, transparency masters, handouts, pretests, and posttests. (KC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

Volume I: Basic Skills - Math

Courses

Basic Math Refresher Course
Math in the Workplace
Mathematics Skills for the Workplace
Budgeting Workshop for the Workplace

Curriculum Guides

Colorado Workplace Learning Initiative: Skills for Productivity and Career Enhancement (1991 - 92)

Contact: Colorado Community College & Occupational Education System (303-620-4000)

Volume I:	Basic Skills -	Math
Volume II:	Basic Skills -	English as a Second Language (ESL)
Volume III:	Basic Skills -	Reading Writing
Volume IV:	Basic Skills -	General Educational Development (GED)
Volume V:	Function Skills -	Computer Proficiency Safety Basics Spanish
Volume VI:	Enhanced Basic Skills -	Learning to Learn Career Planning
Volume VII:	Enhanced Basic Skills -	Teams and Teamwork Problem - Solving, Decision - Making, & Critical Thinking Stress Management
Volume VIII:	Enhanced Basic Skills -	Listening Skills Communications Speech Self-Esteem Individual Workplace Skills

SUMMARY OF CURRICULUM TOPICS SUBMITTED FOR "THE COLORADO WORKPLACE LEARNING INITIATIVE: SKILLS FOR PRODUCTIVITY AND CAREER ENHANCEMENT"
1991 - 1992 PROGRAM

The program is described on the attached abstract. Contained in this series of curriculum guides are the outlines and notes for the topics covered according to the basic skills needs of the business partners. For more information, contact Colorado Community College and Occupational Education System, 303-620-4000.

COMMUNITY COLLEGE OF AURORA	COMMUNITY COLLEGE OF DENVER	COMMUNITY COLLEGE OF DENVER-TECH CENTER	PUEBLO COMMUNITY COLLEGE	PIKES PEAK COMMUNITY COLLEGE
Basic Skills				
math	math	math	math	math
English as a Second Language (ESL)		ESL		ESL
		reading	reading	reading & speed reading
writing				writing (3 part)
		GED	GED	
Functional (Job) Skills				
computer proficiency	computer proficiency and basic software skills	computer proficiency	computer proficiency	
			safety basics for the workplace	
Spanish			Spanish	
Enhanced Basic Skills				
		learning to learn		learning to learn
career planning	transfer techniques			career planning
teamwork				understanding team development process and teams
problem-solving			problem-solving	problem-solving
stress management	stress management		stress management	
listening skills	listening skills		listening skills	
interpersonal communications	conflict resolution		interpersonal communications	overview of communications and interpersonal communications
			speech	
		self-esteem in the workplace	self-esteem	
			individual workplace skills	

BASIC

MATH

REFRESHER

COURSE

by Anita DeMarco

BASIC MATH REFRESHER COURSE

Course Overview

The purpose of this course is to provide an opportunity for students to review basic math skills in order to

1. improve job performance
2. prepare for more advanced math training
3. prepare for formal assessment of basic math skills, i.e. GED testing, employment testing, college entrance exams, etc.
4. achieve other personal goals

Depending on the goal(s) of the students, additional activities may be added to customize the course; for example, bringing to class sample math problems from the workplace, introducing more advanced mathematics, or practice testing for GED or employment tests.

This course is designed to be a "refresher" course. Class participants should already have been exposed to basic math concepts and skills but would benefit from a review of the materials presented in class, including whole number place value and rounding (this course assumes mastery of the four operations of whole numbers), fractions, decimals, and percents.

Objectives

By the end of this course, the student will have mastered basic math skills in the areas of whole numbers, fractions, decimals, and percents.

Timing

The course was designed to provide a review of basic math skills over a nine-week period, meeting twice a week for 1 1/2 hours each class period. The first class of each week is presented in a group format to review a particular math skill. The purpose of the second class of each week is to allow students an opportunity to review in a self-paced lab situation the material covered in the preceding class (see **Example #1** for a sample course schedule). However, the delivery format can be adjusted to fit your own program needs.

Materials

Material requirements will be specified for each class. Many of the classes utilize the *Breakthrough to Math Series, Level 1 and Level 2* by New Readers Press (1-800-448-8878).

Homework

All homework assignments are from the Workbook for Level One and Workbook for Level Two from the *Breakthrough to Math Series* listed above.

Homework assignments may be submitted to the instructor the following week, or students may correct their own work by having the answers attached to their homework packets.

Class 1: Introduction/Assessment

Student objectives:

1. To have an understanding of course format and objectives

2. To take an assessment on basic math skills

Class activities:

1. Introductions - instructor and students

2. Discuss objectives of class - ask students to state what they hope to get out of this course.

3. Discuss class format - hand out schedule (see **Example #1**)

    a. Tues./Thurs.
        - structured group class on Tuesdays
        - lab format on Thursdays to review Tuesday's class
    b. class hours
    c. pre-test/post test

4. Students take pretest (any competency based basic math assessment is appropriate)

Homework:

None

Materials:

1. Class schedules (see **Example #1**)

2. Basic math pretest

3. Pencils

4. Scratch paper

Class 2: Lab Orientation

Student objective:

To learn how to access and utilize lab materials for review of math skills covered that week

Class activities:

1. Discuss objective of today's class.
2. Explain use of learning materials to review math skills.
3. Have students sample different learning materials available in the lab.

Homework:

None

Materials:

Learning materials for review of basic math including workbooks, software programs, audio-visual materials, etc.

Class 3: Introduction to Whole Numbers and Decimals

Student objectives:

1. To learn how to use index cards for studying basic math
2. To classify a number as prime or composite
3 To list all factors of a number
4. To identify the least common multiple of two numbers
5. To identify the place value of a digit in whole numbers or decimals
6. To round whole numbers and decimals

Class activities:

1. Discuss results of pretest - what are areas of strength and weakness for the class
2. Explain use of index cards for review of math concepts
    a. each student makes a card to record definitions, steps in a math problem, and/or example problems; one index card per definition, procedure, or sample problem
    b. each studdent studies his/her cards out loud or has someone quiz him/her every day outside of class
3. Review prime/composite numbers and factoring
    a. "What do all these numbers have in common?" (use overhead with prime numbers written on it)
    b. Have students define prime numbers; record their definitions on board/overhead
    c. "What are other numbers called?" (composite)

d. Chart classifying prime/composite numbers (see **Overhead #1**)
   - each student gives a number, lists factors, and class agrees on classification

e. Make sample index card for prime/composite numbers using overhead transparency to demonstrate possibilities to class

4. Review least common multiples

   a. count by 2's, 5's, and 10's (see **Overhead #2**)
   b. find common multiples of 2, 5, and 10
   c. identify least common multiple of 2, 5, and 10
   d. each student is assigned a number and writes first ten multiples of that number
   e. call two at a time to the board to list their multiples and have them determine least common multiple
   f. make sample index card for least common multiple on an overhead transparency

5. Place value

   a. pieces of plain construction paper on the wall to stand for place values (one color for each whole number place, decimal point in the middle, and another color for each decimal place)
   b. hand out white paper with a place value written on each piece, i.e. **tens, ones, hundredths**, etc.
   c. start at decimal point and go left, "What's the name of the first place?"
   d. start at decimal point and go right
   e. after orally reviewing place values, have students tape white place value names on proper pieces of construction paper
   f. make sample index card for place value on overhead transparency

6. Rounding

   a. discuss how we use rounding in everyday life
   b. practice rounding
      - have student give a number (whole and/or decimal) and instructor writes it on the

- board
- another student gives a place value
- instructor performs rounding based on that place value
- continue doing practice problems

c. students make their own index card for rounding

Homework:

1. Worksheet #6 (p. 8 in Workbook for Level One)

2. Worksheets #23-24 and #33 (pp. 25-26 and p. 35 in Workbook for Level Two)

Materials:

1. Flip chart/white board

2. Pens for writing on flip chart/white board

3. Index cards

4. Overheads #1 and #2

5. Three blank overhead transparencies

6. Overhead projector

7. Seven pieces of colored paper for whole number place values

8. Six pieces of another colored paper for decimal place values

9. One piece of another colored paper for the decimal point

10. Fourteen pieces of white paper with place values written on them and a decimal point on one piece

11. Workbook for Level One

12. Workbook for Level Two

13. Homework packets (see **Homework**)

Classes 4, 6, 8, 10, 12, 14, 16: Lab time

These classes are scheduled to provide practice on the math skill(s) reviewed that week. They take place in a self-study lab setting with a variety of learning materials to reinforce skill development.

Class 5: Introduction to Fractions

Student objectives:

1. To identify and define proper fractions, improper fractions, and mixed numbers
2. To convert improper fractions/mixed numbers
3. To reduce fractions to lowest terms

Class activities:

1. Define the terms **proper fraction, improper fraction,** and **mixed number** (Overheads from Level 2, Book 1, pp. 17-20)
2. Convert improper fractions/mixed numbers (Overheads from Level 2, Book 1, pp. 21-23 and pp. 25-27)
3. Reduce fractions to lowest terms (Overheads from Level 2, Book 1, pp. 33-37)
4. Students make index cards for concepts covered in class.

Homework:

Worksheets #1-6 (pp. 3-8 in Workbook for Level Two)

Materials:

1. *Breakthrough to Math*, Level 2, Book 1
2. Overheads (see **Class activities**)
3. Overhead projector
4. Workbook for Level Two

5. Homework packets (see **Homework**)

6. Index cards

Class 7: Adding and Subtracting Fractions

Student objectives:

1. To add fractions
2. To subtract fractions

Class activities:

1. Add fractions with same denominator (Overheads from Level 2, Book 2, pp. 6-9)
2. Add fractions with different denominators (Overheads from Level 2, Book 2, pp. 11-13 and pp. 15-19)
3. Subtract fractions with same denominator (Overheads from Level 2, Book 2, pp. 21-22 and 27-29)
4. Subtract fractions with different denominators (Overheads from Level 2, Book 2, pp. 23-25 and pp. 31-33)
5. Borrowing (Overheads from Level 2, Book 2, pp. 35-37 and pp. 39-43)
6. Students make index cards for concepts covered in class.

Homework:

Worksheets #9-17 (pp. 11-19 in Workbook for Level Two)

Materials:

1. *Breakthrough to Math*, Level 2, Book 2
2. Overheads (see **Class activities**)
3. Overhead projector

4. Workbook for Level Two
5. Homework packets (see **Homework**)
6. Index cards

Class 9: Multiplying and Dividing Fractions

Student objectives:

1. To multiply fractions
2. To divide fractions

Class activities:

1. Multiply fractions (Overheads from Level 2, Book 3, pp. 6-11)
2. Canceling (Overheads from Level 2, Book 3, pp. 13-15)
3. Multiplying mixed numbers (Overheads from Level 2, Book 3, pp. 17-19)
4. Dividing fractions (Overheads from Level 2, Book 3, pp. 21-25 and pp. 27-29)
5. Students make index cards for concepts covered in class.

Homework:

Worksheets #18-22 (pp. 20-24 in Workbook for Level Two)

Materials:

1. *Breakthrough to Math*, Level Two, Book 3
2. Overheads (see **Class activities**)
3. Overhead projector
4. Workbook for Level Two
5. Homework packets (see **Homework**)
6. Index cards

Class 11: Decimals

Student objectives:

1. To add decimals
2. To subtract decimals
3. To multiply decimals
4. To divide decimals

Class activities:

1. Group work (see **Overhead #3**); write in students' names for each group
2. Each group presents their five problems to the rest of the class on an overhead transparency
3. Class solves problems and then group demonstrates correct procedure(s) for solving problems
4. Students make index cards for concepts covered in class.

Homework:

Worksheets #25-32 (pp. 27-34 in Workbook for Level Two)

Materials:

1. Overhead #3
2. Overhead projector
3. Four blank transparencies
4. Workbook for Level Two

5. Homework packets (see **Homework**)

6. Index cards

Class 13: Converting Fractions/Decimals/Percents

Student objectives:

1. To convert fractions to decimals
2. To convert decimals to fractions
3. To convert decimals to percents
4. To convert percents to decimals
5. To convert fractions to percents
6. To convert percents to fractions

Class activities:

1. Give class quiz on conversion (see **Handout #1**).
2. Go over answers to quiz.
3. Make two sets of cards (25 cards per set)
   a. one set of numbers: fractions, decimals, and percents (i.e. 3/4, .125, 82%, etc.)
   b. one set of words: **fraction, decimal, percent** (one word per card)
4. Divide the class into two teams.
5. One team draws a card from the word pile.
6. The other team draws a card from the number pile. That team must then send a member to the board to convert that number to the word drawn from the word pile (i.e. 1/2 to a percent). Decide at the beginning whether that person will be expected to solve the problem on his/her own or with help from the team.

Optional: If the team/member answers correctly, the team scores a point.

7. Teams alternate drawing word and number cards

8. Students make index cards for concepts covered in class.

Homework:

Worksheets #34-38 (pp. 36-40 in Workbook for Level Two)

Materials:

1. Conversion review exercise (see **Handout #1**)

2. Two set of cards - 25 number, 25 word

3. Whiteboard/chalkboard and markers/chalk

4. Workbook for Level Two

5. Homework packets (see **Homework**)

6. Index cards

Class 15: Percents

Student objective:

To solve percent problems

Class activities:

1. Identify the three numbers in a percent problem (Overheads from Level 2, Book 5, pp. 42-43)
2. Steps for solving a percent problem (see **Overhead #4** and **Handout #2**)
3. Practice percent problems with class using Overhead and Handout as a guide.
4. Practice identifying the three numbers in percent word problems and solving for the missing number.
5. Students make index cards for concepts covered in class.

Homework:

Worksheets #39-43, #45, and #47 (pp. 41-45, p. 47, and p. 49 in Workbook for Level Two)

Materials:

1. *Breakthrough to Math*, Level 2, Book 5
2. Overheads (see **Class activities**)
3. Overhead #4
4. Handout #2
5. Overhead projector

6. Workbook for Level Two

7. Homework packets (see **Homework**)

8. Index cards

Class 17: Post Test

This class can be used to post test students to determine skill improvement, based on pretest results. It is recommended that a different form of the pretest be administered as a post test.

Overhead #1

PRIME NUMBERS	COMPOSITE NUMBERS

Overhead #2

2 4 6 8 10 12 14 16 18 20

5 10 20 30 40 50 60 70 80 90

10 20 30 40 50 60 70 80 90 100

Overhead #3

GROUP ACTIVITY

1. Write steps for your operation for the rest of the class to write on index cards (put on overhead transparency sheet).
2. Make up five problems for the class to do (put on overhead transparency sheet). Don't forget to figure out answers too, but don't include them on the transparency!
3. Your group will have 20 minutes to work together on this.

Group 1: Adding Decimals

Group 2: Subtracting Decimals

Group 3: Multiplying Decimals

Group 4: Dividing Decimals

Overhead #4

STEPS FOR SOLVING PERCENT PROBLEMS

____
(write problem)

1. Set up problem as a ratio.

2. Cross multiply.

3. Divide

____
(rewrite problem with correct answer)

Handout #1

CONVERTING FRACTIONS, DECIMALS, AND PERCENTS

Directions: Match the conversion on the left with the correct procedure on the right.

_____	decimals to percents	a.	divide the numerator by the denominator
_____	fraction to decimal	b.	place the number value over 100 and reduce
_____	decimal to fraction	c.	divide the numerator by the denominator, and then move the decimal point two places to the right and add a percent sign
_____	percent to decimal	d.	place the number value over the place value and reduce
_____	percent to fraction	e.	move the decimal point two places to the right and add a percent sign
_____	fraction to percent	f.	move the decimal point two places to the left and drop the percent sign

Handout #2

STEPS FOR SOLVING PERCENT PROBLEMS

____

(write problem)

1. Set up problem as a ratio.

2. Cross multiply.

3. Divide

____

(rewrite problem with correct answer)

Example #1

BASIC MATH REFRESHER WORKSHOPS

Day	Date	Activity	Class/Lab
Tuesday	Nov.5	pretest	class
Thursday	Nov. 7	lab orientation	class
Tuesday	Nov. 12	whole numbers	class
Thursday	Nov. 14	whole numbers	lab
Tuesday	Nov. 19	fractions add & subt.	class
Thursday	Nov. 21	fractions add. & subt.	lab
Tuesday	Nov. 26	fractions mult. & div.	class
Thursday	Nov. 28	fractions mult. & div.	lab
Tuesday	Dec. 3	decimals	class
Thursday	Dec. 5	decimals	lab
Tuesday	Dec. 10	converting	class
Thursday	Dec. 12	converting	lab
Tuesday	Dec. 17	percents	class
Thursday	Dec. 19	post test	class

Example #2

STEPS FOR SOLVING PERCENT PROBLEMS

50% of what is 70

(write problem)

1. **Set up problem as a ratio.**

$$\frac{\text{percent}}{100} = \frac{\text{part}}{\text{whole}} \qquad \frac{50}{100} = \frac{70}{x}$$

2. **Cross multiply.**

$$(70)(100) = (50)(x)$$

$$7{,}000 = 50x$$

3. **Divide**

$$\frac{7{,}000}{50} = \frac{50x}{50}$$

$$50\overline{)7000} \quad 140 = x$$

50

200

200

00

50% of 140 is 70

(rewrite problem with correct answer)

Math In The WorkPlace (Mat 084)

PIKES PEAK COMMUNITY COLLEGE

OBJECTIVE: The student will become competent in addition, subtraction, multiplication, and division of whole numbers, fractions, and decimals. Students will use these skills to solve work problems and problems involving ratios, proportions, and percents and will incorporate all the above with "work" related problems.

TIMING: This class has two 50 minute sections twice a week for 15 weeks.

MATERIALS: You will need;

1. Textbook: Essential Mathematics with Applications; Barker/Aufman
2. Answer Book
3. Chalkboard and Chalk
4. Handouts S, 4.4
5. Tests P, Ch. 1-6, Make-up

EXTRA CURRICULUM ASSIGNMENT: The students were to turn in a minimum of 8 "Bonus Questions" throughout the course. These were created by each student and work-place specific. They were to choose one (or more) objective(s) from the previous chapter or for each objective chosen, write an application problem they might encounter in their job, complete with solution. The following are some actual "Bonus Questions" students have created.

Example 1: A secretary has to buy a whiteboard that is 3.5 ft. long and she can only spend $56.50. The cheapest one she can find is $75.86 and is 3.25 ft. long.

A. How much more will she have to pay?

B. What is the difference in length?

A.	$75.86	B.	3.5
	-56.50		-3.25
	$19.36 more		.25 ft.

Example 2: One PC board has 12 insertions (parts). 75% of them are defective. How many good parts remain?

12 x .75 = 9 defective parts

12 - 9 = 3 good parts

SUGGESTIONS:

1. It would be helpful for the instructor to familiarize themselves with their students daily work situations via meeting individually with students, their supervisors and/or on-site visitations.

2. Also, it might be advantageous to discuss other student "Bonus Questions" in class to give students ideas of how to apply mathematics. In addition, this will build confidence in the students ability to use math to solve a variety of problems.

TIME TABLE:

In general, every class period was divided as follows:

30 min.	Review previous class objectives, answer questions, do examples and homework problems that were challenging.
70 min.	Introducing and demonstrating new objectives, and students practicing new objectives.

OBJECTIVES COVERED:

At the conclusion of each objective, homework was assigned. In most cases, only odd numbered problems were assigned so the student could check their answers immediately. The student was given credit for attempting homework not on percentage correctly completed.

Day 1:

Pretest - Test P

Explained that they should be able to complete part A and that part B will be covered in this course.

Overview of Addition, Subtraction, Multiplication and Division of Whole Numbers

Day 2:

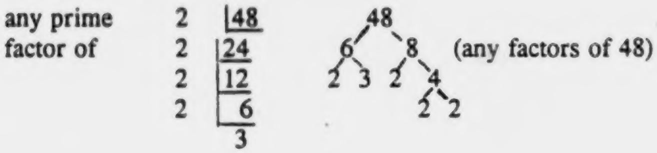
Exponential Notation and Order of Operations

A. Introduced an acronym for order of operations, Please Excuse My Dear Aunt Sally (Parenthesis, Exponents, Mult, Div, Add, Subtr.)

B. Discussed n = 1

Prime Numbers and Factoring

A. Two factorization methods



Day 3: **Chapter 1 Word Problems** (at end of each objective)

A. Point out key words for each operation

Review - In class
Bonus Questions - Due at end of class

Day 4: **Chapter 1 Test** - (Homework for Chapter 1 due)

Day 5: **Least Common Multiple and Greatest Common Factor**
Intro at Fractions
Writing Equivalent Fractions

Day 6: **Addition of Fractions and Mixed Numbers**
Subtraction of Fractions and Mixed Numbers

Day 7: **Multiplication of Fractions and Mixed Numbers**

A. Reminded student about cross canceling
B. Challenge Problem: 3 2/3 X 2 5/14 x 4/21

Division of Fractions and Mixed Numbers

A. Challenge Problem: 3 2/3 ÷ 6 ÷ 1 4/18

Day 8: **Order, Exponents, and Order of Operations**

Day 9: **Chapter 2 Word Problems**
Review
Bonus Questions

Day 10: **Chapter 2 Test** - (Homework for Chapter 2 due)

Day 11: **Introduction to Decimals**
Addition of Decimals

A. Stressed importance of estimating (rounding) in "real world" situations. Assigned odd problems, working exact answers and estimating to the ones place to check reasonability of exact answers.

Day 12: **Subtraction of Decimals**

A. Exact and estimate answers.

Multiplication of Decimals

Day 13: **Division of Decimals**
Comparing and Converting Fractions and Decimals

A. Definitions of terminating, repeating and nonterminating nonrepeating decimals

Day 14: **Chapter 3 Word Problems**
Review
Bonus Questions

Day 15: **Chapter 3 Test** - (Homework for Chapter 3 due)

Day 16: **Ratio**
Rates
Proportions

Day 17: **Metrics** - Objective is to familiarize oneself with the metric system

A. Stated order of kilo, hecto, deka, deci, centi, milli
B. Demonstrated approximate sizes of various measurements
C. Reviewed English measurements
D. Assigned Handout 4.4

Graphs -

A. Talked about advantages and disadvantages of bar, line, and circle (pie) graphs
B. Students were to bring to class one of each either from work or newspaper
C. Students answered general questions to familiarize themselves with how to read and use graphs

Day 18: **Chapter 4 Word Problems**
Review
Bonus Questions

Day 19: **Chapter 4 Test** - (Homework for Chapter 5 due)

Day 20: **Introduction to Percents**
Percent Equations ("amount" missing)

Day 21: **Percent Equations ("percent" and "base" missing)**

Day 22: **Percent Equations (proportion method)**

Day 23: **Chapter 5 Word Problems** - allowed students to use method most comfortable to them

Day 24: **Chapter 5 Test** - (Homework for Chapter 5 due)

Day 25: **Applications to Purchasing**
Percent Increase and Percent Decrease
Interest

Day 26: **Real Estate Expenses**
Car Expenses

Day 27: **Wages**
Bank Statements

Day 28: **Review**
Post Test (use Test P, Part B) - Afterwards I returned pretest and let students see how much they have learned during the semester!

Day 29: **Chapter 6 Test** - (Homework for Chapter 6 due and notes due)

Day 30: **Make-Up Test** - (replaces missed test or low scoring test)

HANDOUT S

PIKES PEAK COMMUNITY COLLEGE

SYLLABUS
MAT 084
DAYS: ____________
TIME: ____________

INSTRUCTOR:
TELEPHONE:

COURSE MATERIALS

Textbook: Essential Mathematics with Appl:
Barker/Aufmann
Supplies: Notebook to organize homework, quizzes and notes
Calculator (optional)

OBJECTIVE

The student will become competent in addition, subtraction, multiplication, and division of whole numbers, fractions, and decimals. Students will use these skills to solve work problems and problems involving ratios, proportions, and percents and will incorporate all the above with "work" related problems.

GENERAL INFORMATION

ATTENDANCE: I assume my students are adults serious about learning and, therefore, will be punctual and consistent in attendance.

SPECIAL HELP: I will be available a few minutes before and after class for those needing extra help. You may also want to take advantage of PPCC's lab located in A-316 for free tutoring.

ASSIGNMENTS: Homework will be assigned every class and expected to be completed before the quiz is taken for that chapter.

GRADING:

Percent	Points
93-100 = A	930 -1000 = A
84-92 = B	840- 929 = B
75-83 = C	750- 839 = C
70-74 = D	700- 749 = C
69-0 = F	0-699 = F

HANDOUT 4.4

PIKES PEAK COMMUNITY COLLEGE

MAT 084

Match each statement on the left with the most reasonable measure on the right.

______1. The width of a room.

______2. The capacity of a can of wall paint.

______3. The weight of a bag of sugar.

______4. The distance between 2 towns.

______5. The capacity of a can of car oil.

______6. The weight of a hamburger patty.

______7. The height of a chair.

______8. The weight of an African elephant.

______9. The distance from home to work.

______10. The capacity of a city water tank.

______11. The mass of an alarm clock.

______12. The length of a paper clip.

______13. The mass of a large bird feather

______14. The capacity of a kitchen sink.

______15. The capacity of a large table spoon.

5 T.

3 mi.

5 oz.

3 yd.

5 lbs.

1 qt.

3 ft.

1 gal.

50 mg.

3 km.

50 g.

20 kl.

3 cm.

20 ml.

20 l.

TEST P
Math Pre-test, Part A

Name________________________

Show all work on this page.

____________1. 353
246
+672

2. 78+189+4+596

3. 597 - 136

____________2.

____________3.

____________4. 4,037
-1,685

5. 8,900
- 576

6. 67
x 48

____________5.

____________6.

____________7. 638 X 905

8. 5,648 ÷ 8

9. $28\overline{)11,564}$

____________8.

____________9.

____________10. $61\overline{)4,402}$

11. Rita's breadfast contained 370 calories, lunch contained 325 calories and an afternoon snack contained 45 calories. She is allowing herself 2,000 calories a day. How many calories can Rita take in at dinner?

____________11.

____________12. Write using digits: one hundred sixty thousand, forty-seven.

TEST P
Math Pre-test, Part B

Name____________________

Do all work on this page. Reduce fractions when possible. Do not use a calculator.

____________1. $\frac{3}{8} \div \frac{5}{6}$

2. $7\frac{1}{2} - 3\frac{3}{4}$

3. $2\frac{2}{3} \cdot 3\frac{1}{2}$

____________2.

____________3.

____________4. $\frac{6}{7} \div \frac{3}{4}$

5. 18.2 - 7.37

6. 0.87 x 0.9
(round answer to hundredths)

____________5.

____________6.

____________7. Divide: 4.5 ÷ 0.05

8. What is 8% of $95?

____________8.

____________9. Write the decimal numeral for five thousand, two hundred eighty and sixteen thousandths.

10. A student got 18 questic correct on a 24 question test. What percent did he get right?

____________10.

____________11. Change $\frac{3}{8}$ to an equvalent three place decimal numeral.

____________12. A man bought three shirts at $13.95 each (tax included) and two sweaters at $19.48 each. How much change should he receive, if he gave the clerk a $100 bill?

CHAPTER 1 TEST
MAT 084

NAME________________________

Place the correct symbol $<, >$ between the two numbers.

____________1a. 45   54

____________b. 5270   2850

____________________________________2. Write 9040 in words.

____________3. Write seven hundred ten thousand two hundred two in standard form.

____________4a. Round 35,099 to nearest thousand

____________ b. Round 605 to nearest tens

____________5. Add: $567 + 23 + 849$

____________6. Add: $35 + 8701 + 5293 + 51$

____________7. Subtract: $1539 - 722$

____________8. Subtract: $8301 - 7499$

____________9. Multiply: 3274×37

____________10. Multiply: 9900×306

____________11. Divide: $5\overline{)372}$

____________12. Divide: $29{,}645 \div 73$

____________13. Write $2\cdot2\cdot2\cdot3\cdot3\cdot7\cdot7\cdot7\cdot7$ in exponential notation.

____________14. Simplify completely: $2\cdot4^3\cdot5^0$

____________15. Simplify: $10 - 4 \div 2$

____________16. Simplify: $7(8 - 5) + 18 \div 3^2$

____________17. Find all factors of 72.

____________18. Find the prime factorization of 200.

__________________19. A shipment of 9810 diodes requires testing. The diodes are divided equally among 15 employees. How many diodes does each employee test?

__________________20. A lab technician receives a total salary of $2325 per month. Deductions from the check are $524 for taxes, $139 for Social Security and $42 for insurance. Find his take-home pay.

__________________21. A software company made profits of $1,560,752, $2,964,003 and $4,500,491 during its first 3 years. Find their total profit.

__________________22. A tooling machine produces 260 bearings in one hour. How many bearings does the machine produce in 40 hours?

__________________23. How much larger is Alaska than Texas? Alaska is 586,400 square miles in area, and Texas is 267,339 square miles in area.

__________________24. A gasoline storage tank contains 66,000 gal. of gasoline. A valve is opened which lets out 30 gal. each minute. How many gal. remain in the tank after 40 minutes?

__________________25. A tannery produces and packages 320 briefcases each hour. Ten briefcases are put in each package for shipment. How many packages of briefcases can be produced in 8 hours?

WORK SPACE

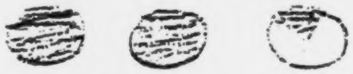
CHAPTER 2 TEST
MAT 084

NAME________________________

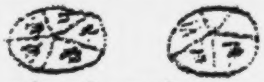
___________1. Find the LCM of 8 and 10.

___________2. Find the GCF of 36 and 56.

___________3a. Express the shaded portion of the circles as a mixed number.



___________3b. Express the shaded portion of the circles as an improper fraction.



___________4a. Write $\frac{19}{4}$ as a mixed number.

___________4b. Write $\frac{15}{7}$ as a mixed number

___________5a, Write $6\frac{2}{3}$ as an improper fraction.

___________5b. Write $4\frac{5}{9}$ as an improper fraction.

___________6a. Write an equivalent fraction with the given denominator.

___________6b. a. $\frac{3}{4} = \frac{?}{28}$ b. $\frac{11}{13} = \frac{?}{65}$

___________7a. Write in simplest form (reduce):

___________ b. a. $\frac{60}{96}$ b. $\frac{39}{13}$

Perform the indicated operation:

___________8. $\frac{7}{9} + \frac{10}{12}$

___________9. $\frac{4}{5} + \frac{1}{6} + \frac{15}{18}$

__________10. $6\frac{1}{2} + 5\frac{2}{3} + 9\frac{3}{4}$

__________ 11. $\frac{3}{4} - \frac{2}{5}$

__________ 12. $15\frac{5}{6} - 6$

__________ 13. $103\frac{3}{8} - 54\frac{4}{7}$

__________ 14. $\frac{2}{3} \times \frac{5}{8}$

__________ 15. $\frac{6}{7} \times \frac{14}{15} \times \frac{5}{8}$

__________ 16. $2\frac{1}{2} \times 10$

__________ 17. $\frac{5}{12} \div \frac{5}{8} \div 4$

__________ 18. $4\frac{6}{7} \div 2\frac{1}{14}$

__________ 19. Place <, > between: $\frac{13}{20}$ $\frac{5}{7}$

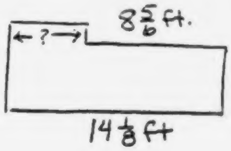
__________ 20. Simplify: $\left(\frac{11}{12} - \frac{2}{3}\right) + \frac{15}{16} \div \left(\frac{1}{2}\right)^3$

__________ 21. A plumber works $1\frac{1}{2}$ hours of overtime on Monday, $2\frac{1}{4}$ hours on Tuesday, and $3\frac{1}{4}$ hours on Wednesday. Find the total number of hours of overtime worked during the 3 days.

CHAPTER 2 TEST
Page 3

____________22. A board is $8\frac{3}{4}$ feet long. One-fourth of the board is cut off. What is the length of the piece cut off?

____________23. Find the missing dimension.



____________24. A $2\frac{1}{2}$- gram precious metal ingot sold for $30. Find the price per gram of the precious metal.

____________25. A shipment of 2500 parts were received. It is estimated that $\frac{1}{4}$ of them get damaged in transit. How many parts should be operational?

CHAPTER 3 TEST
MAT 084

NAME____________________

____________________1. Write 2.007 in words.

________________2. Write in standard form: ninety-nine and seven hundred four-thousandths

____________3.a. Round 9.138 to the nearest tenth.

____________ b. Round 6.27958 to the nearest thousandth.

Perform the indicated operation.

____________4. 3.514 + 22.6981 + 145.78

____________5. 6.841 + 54 + 59.3254

____________6. 29.843 - 12.76

____________7. 177.31 - 42.126

____________8. 0.57 X 4

____________9. 3.9 X 0.44

____________10. 7.9142 X 1000

____________11. 40 ÷ 0.8

____________12. 6.515 ÷ 5

____________13. 36.597 ÷ 53.2
(round to nearest hundredth)

____________14. Convert $5\frac{2}{3}$ to a decimal

____________15. Convert $\frac{5}{4}$ to a decimal.

____________16. Convert 18.4 to a fraction.

____________17. Convert 0.055 go a fraction.

_____________ 18. Convert $0.16\frac{4}{7}$ to a fraction

_____________ 19. Compare $\frac{7}{9}$ and 0.76

_____________ 20. You have $655.12 in your checking account. You make deposits of $753.42, $49.90, $67.34 and $152.18. Find the amount in your checking account after making the deposits.

_____________ 21. Rainfall for the last three months of the year was 3.42in., 6.19in., and 4.65in. The normal rainfall for the last three months of the year is 11.4in. How many inches above normal was the rainfall?

_____________ 22. A sheet of plywood is 0.25 inch thick. Find the height of a stack of 150 sheets of plywood.

_____________ 23. You pay $542.36 per year in life insurance premiums. If you pay the premiums in 12 equal monthly payment, how much is each monthly payment?

____________24a. A secretary has to buy a whiteboard that is 3.5 ft. long and she can only spend $56.50. The cheapest one she can find is for $75.86, and is 3.25 ft. long.

____________b.

A. How much more will she have to pay?
B. What is the difference in length of the 2 boards?

____________25. One PC board has 12 insertions (parts). 0.75 of them are defective. How many good parts remain?

MAT 084
CHAPTER 4 TEST

NAME____________________

___________1.a. Write the comparison 6 minutes to 16 minutes as a ratio in simplest form.
___________ b. Write the comparison 12 pints to 36 pints as a ratio in simplest form.

___________2.a. Write as a rate in simplest form: 182 mi on 6 gal.
___________ b. Write as a rate in simplest form: 6 tablets in 24 hr.

___________3. Write as a unit rate: $18,000 earned in 12 months

___________4. Write as a unit rate: 498 miles in 10 hours

___________5. WRite as a unit rate: 352 words in 5.5 minutes

___________6.a. Is the proportion true? $\frac{4}{5} = \frac{16}{20}$
___________ b. Is the proportion true? $\frac{9}{18} = \frac{12}{24}$

___________7. Solve the proportion: $\frac{14}{24} = \frac{7}{n}$

___________8. Solve the proportion: $\frac{n}{8} = \frac{9}{12}$

___________9. Solve the proportion: $\frac{8}{18} = \frac{n}{2}$

___________10. The total cost of making 5000 floppy disks was $6027. Of the disks made, 100 did not meet company standards. What was the cost per disk for those disks which met company standards?

___________11. A store bought 175 dish towels wholesale for $152.25 and sold them for $243.25. What was the store's profit per towel?

__________12. During one month, a furniture store sold 240 bedroom sets and 144 dining room sets. Find the ratio, as a fraction in simplest form, of dining room sets sold to the number of bedroom sets sold.

__________13. A grocery store sells 3 pounds of grapes for $2. What is the cost of 1 pound? Round to the nearest cent.

__________14. A transistor company expects that 3 out of 245 transistors will be defective. How many defective transistors will be found in a batch of 184,485 transistors?

__________15. A department store makes a profit of $15.20 on every 25 rolls of film sold. How much profit is make if 16 rolls of film are sold?

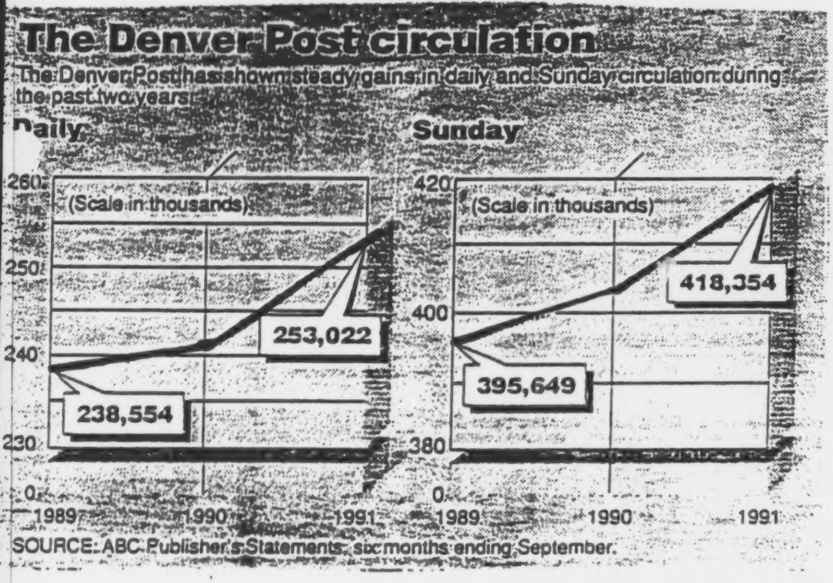
__________16. For every 10 people who work in a city, 7 of them commute by public transportation. If 34,600 people work in the city, how many of them do not take public transportation?

____________17. For every 15 gallons of water pumped into the holding tank, 8 gallons were pumped out. After 930 gallons had been pumped in, how much water remained in the tank?

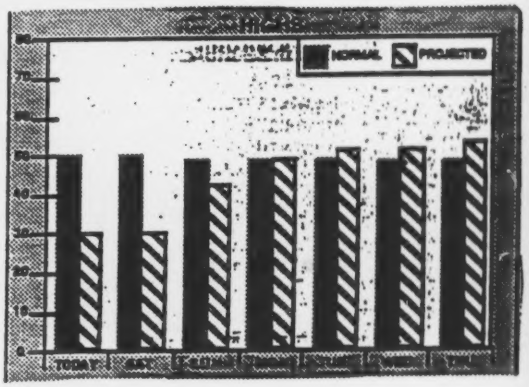
____________18.a. According to the bar graph, what day is the projected and normal high the same temperature and what is that temperature?

____________ b. According to the line graph, what is the approximate daily and Sunday circulation during 1990?

____



SOURCE: ABC Publisher's Statements, six months ending September.



What is the most likely measure of a:

____________19.a. length of a pallet

____________ b. weight of a PC

5mL, 5L, 6m, 6cm, 7g, 7kg

____________20.a. weight of a loaded truck

____________ b. amount of coffee an average person drinks per day

2in, 2yd, 3lb, 3T, 4c, 4 gal

BEST COPY AVAILABLE

MAT 084
CHAPTER 5 TEST

NAME____________________

__________1.a. Write 125% as a decimal.

__________b. Write 34.07% as a decimal.

__________2.a. Write 65% as a fraction.

__________ b. Write $7\frac{8}{9}\%$ as a fraction.

__________3.a. Write 0.04 as a percent.

__________ b. Write 0.96 as a percent.

__________4. Write $\frac{25}{60}$ as a percent. Write remainder as a fraction.

__________5. Write $1\frac{1}{7}$ as a percent. Write remainder as a fraction.

__________6. 56 is 70% of what?

__________7. What is 150% of 98?

__________8. 54 is what percent of 150?

__________9. .75% of what is 12.75?

__________10. What percent of 72 is 12?

__________11. What is 5% of 900?

__________12. 24% of what is 36?

__________13. What is 14% of 250?

__________14. What percent of 72 is 9?

__________15. 210% of 390 is what?

__________16. An advertising survey of 265 people found that 53 liked a new toothpaste. What percent of the people surveyed did not like the new toothpaste?

__________17. A quality control inspector found that 0.2% of the 2500 flathead screws inspected were defective. How many screws were not defective?

__________18. A police station received 8 calls concerning shoplifting in 1 day. This was $33\frac{1}{3}\%$ of the total number of calls received that day. How many calls in all did the police station receive?

__________19. During shipping, 600 of the 4800 light bulbs were damaged. What percent of the number of light bulbs were damaged in shipping?

__________20. You bought a boat 1 year ago. Since then it has depreciated $1018.50, which is 9.7% of the price you paid for it. How much did you pay for the boat?

Mat 084
Chapter 6 Test

NAME____________________

____________1. Find the unit cost: 64 ounces of antifreeze cost $4.99.

____________2. Find the unit cost: 15 pieces of chicken cost $10.50

____________3. Which is the most economical purchase, 48 oz. for $1.92 or 18 oz for $0.72 ?

____________4. Which is the most economical purchase, 35 for $1.40 or 60 for $2.34

____________5. Plywood costs $9.99 per sheet. How much change do you receive from $50.00 when purchasing 4 sheets?

____________6. A beach-wear shop uses a markup rate of 40% on a bathing suit which costs the shop $34. What is the selling price?

____________7. Because of a decrease in orders for telephones, a telephone center reduced the order for phones from 140 per month to 91 per month. What percent decrease does this represent?

____________8. To purchase additional park sites, a county treasurer invested $30,000 in an account which pays 8% annual interest, compounded quarterly. What is the value of the investment after 5 years?

____________9. To finance the purchase of 8 new taxicabs, the owner of the fleet borrows $84,000 for 8 months at an annual interest rate of 16%. What is the simple interest due on the loan?

____________10. An architect purchases a home for $125,000. Find the mortgage if the down payment is 6% of the purchase price.

____________11. A person bought a small business for $150,000 and has a down payment of $30,000. How much is the loan origination fee at 4½ points?

____________12. A four-wheel drive truck is purchased for $9600, and a down payment of 2100 is made. The balance is financed for 3 years at an annual interest rate of 11%. Find the monthly car payment.

____________13. A video technician's hourly wage is $14.60. For working overtime, the technician receives double time. How much does the technician earn for working 52 hours?

____________14. A company which sells medical equipment pays its sales executives a commission of 12% of all sales over $120,000. During one year, a sales executive sold $440,000 worth of medical equipment. Find the commission earned.

____________15. A credit manager had a checking account balance of $535.25 before making a deposit of $216.18. The store manager then wrote two checks, one for $52.63 and another for $260.17. Find the current checkbook balance.

MAT 084
MAKE- UP TEST
CHAPTERS 1 - 6

NAME____________________

____________1. Round to the nearest hundred: 319,582

____________2. Simplify: $16 - 2 \times 4 \div (6 - 3)^2$

____________3. A farmer harvested 48,290 pounds of lemons from one grove and 23,710 pounds of lemons from another grove. The lemons were packed in boxes with 24 pounds in each box. How many boxes were needed to pack the lemons?

____________4. 20,736 - 9854

____________5. $12\frac{5}{7} + 9\frac{7}{15}$

____________6. Which is larger, $\frac{3}{8}$ or $\frac{5}{12}$?

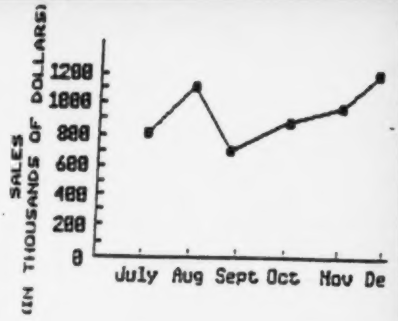
____________7. $6\frac{2}{3} \div 3\frac{1}{6}$

____________8. An investor bought $7\frac{1}{4}$ acres of land for a housing project. One and three-fourths acres were set aside for a park, and the remaining land was developed into $\frac{1}{2}$-acre lots. How many lots were available for sale?

____________9. 37.003 - 9.23674

____________10. .0569 $\div$ .037 (Round to the nearest thousandth)

MAKE-UP TEST
PAGE 2



____________11. Convert 0.825 to a fraction.

____________12. A long distance telephone call cost $.85 for the first 3 minutes and $.42 for each additional minute. Find the cost of a 12-minute long distance telephone call.

____________13. An automobile sales company spends $25,000 each month for television advertising and $40,000 each month for radio advertising. Find the ratio, as a fraction in simplest form, of the cost of radio advertising to the total cost of advertising.

____________14. Solve: $\frac{n}{18} = \frac{9}{4}$

____________15. The dosage of a medicine is ¼ ounce for every 50 pounds of body weight. How many ounces of this medication are required for a person who weighs 175 pounds?

____________16. A plane travels 2421 miles in 4.5 hours. Find the plane's speed in miles per hour.

____________17. The broken-line graph shows the monthly sales for a clothing store for each of the last 6 months of a year. What was the increase in sales from Sept.- Nov?

MAKE-UP TEST
PAGE 3

____________18. What is 77% of 65? (Write remainder as a fraction)

____________19. 26 is what percent of 12? (Write remainder as a fraction)

____________20. 12 is 15% of what?

____________21. A student missed 7 out of 80 questions on a math exam. What percent of the questions did the student answer correctly? (Round to the nearest tenth of a percent)

____________22. The price of a video camera drops from $1120 to $896. What percent decrease does this price drop represent?

____________23. A construction company borrowed $75,000 at an annual interest rate of 11% for 4 months. Find the simple interest due on the loan.

____________24. Red snapper cost $4.15 per pound. Find the cost of 3½ pounds. (Round to the nearest cent.)

____________25. A $17,500 minivan is purchased with an 18% down payment. Find the amount financed.

INTERMEDIATE ALGEBRA (020)

PIKES PEAK COMMUNITY COLLEGE

OBJECTIVE: The student will be able to use the correct order of operations to simplify and evaluate algebraic expressions using real numbers. The student will be able to solve first and second degree equations by factoring. The student will also be able to solve word problems that involve first and second degree equations. In addition, we will incorporate all the above with "work" related problems.

TIMING: This class has two 50 minute sections twice a week for 15 weeks.

MATERIALS: You will need:

1. Textbook: Elementary Algebra for College Students;
   Jerome Kaufmann
2. Answer key book
3. Board, pens, erasers
4. Handouts A (syllabus), B (Example Spreadsheet)
5. Tests P, Ch. 1-6, Final

EXTRA CURRICULUM ASSIGNMENTS: The students were to turn in a minimum of 8 "Bonus Questions" throughout the course. These were created by each student and work place specific. They were to choose one (or more) objective(s) in the previous chapter and for each objective chosen, write an application problem they might encounter in their job, complete with solution. (Spreadsheets were often used to demonstrate "order of operations".) The following is an actual "Bonus Question" a student created.

In order for our chemical waste to be within government standards, we must add water. How much water must be added to 10 gallons of 60% solution to make a 20% solution.

$40(10) + 100x = 80(x + 10)$
$400 + 100x = 80x + 800$
$20x = 400$
$x = 20$ gallons of water

SUGGESTIONS:

1. It would be helpful for the instructor to familiarize themselves with their students' daily work situations via meeting individually with students, their supervisors and/or on site visitations.
2. Also, it might be advantageous to discuss other students' "Bonus Questions" in class to give students their own ideas of how to apply mathematics. In addition, build confidence in the students' ability to use math to solve a variety of problems.
3. It was sometimes difficult for the students to apply each objective to their workplace. Therefore, concentrate more on the solving process rather than the actual exercises.

TIMETABLE: In general, every class period was divided as follows:

30 minutes- Review previous class objectives, answer questions, do examples and homework problems that were challenging.

70 minutes- Introducing new objectives, demonstrating new objectives and students practicing new objectives.

OBJECTIVES COVERED: At the conclusion of each objective, homework was assigned. In most cases, every 3rd problem (3, 6, 9, 12..) was assigned, so the student was not overburdened. Odd numbered problems were given so that the student could check some of their answers immediately and yet not be dependent on the book's answers. The answers to even numbered problems were given the following class period. The student was given credit for attempting homework; not on percentage correctly completed.

Day 1: **Pretest** (Test P)

Explained that they should be able to complete part B and that part C will be covered in this course.

Algebraic Expressions
Prime and Composite Numbers

Day 2: **Integers: Addition, Subtraction, Multiplication, and Division**

Day 3: **Use of Properties**

Day 4: **Review**- In class
Bonus Questions- Due at end of class

Day 5: **Chapter 1 Test**

Homework due for Chapter 1.

Day 6: **Rational Numbers: Addition, Subtraction, Multiplication, and Division**
Real Numbers and Algebraic Expressions

Day 7: **Exponents**
Translating from English to Algebra

Day 8: **Review**
Bonus Questions

Day 9: **Chapter 2 Test**

Homework due for Chapter 2.

Day 10: **Solving First-Degree Equations**
Equations and Problem Solving

Day 11: **More on Solving Equations and Problem Solving**
Equations Involving Parentheses and Fractional Forms

A. Tried to show students how to read and learn from book's, explanations, and examples.

Day 12: **Ratios, Proportions, and Percents**
More on Percents and Problem Solving

Day 13: **Review**
Bonus Questions

Day 14: **Chapter 3 Test**

Homework due for Chapter 3.

Day 15: **Formulas**
Problem Solving
More about Problem Solving

A. Required students to know only following formulas:

$D=R X T$
$A=l X w$
$A=1/2B X H$
$A= \quad R^2$

Went over problem solving techniques in detail:

1. Make diagrams of tables with given information
2. Decide what is missing and choose variable
3. After solving, always check to see if solution is reasonable

Day 16: **Inequalities**
Inequalities, Compound Inequalities, and Problem Solving

Day 17: **Review**
Bonus Questions

Day 18: **Chapter 4 Test**

Homework due for Chapter 4.

Day 19: **Addition and Subtraction of Polynomials**
Multiplying Monomials and Polynomials

A. To aid with multiplication of polynomials, the acronym FOIL (First, Outer, Inner, Last) was introduced.

Day 20: **Dividing by Monomials**
Dividing by Binomials

A. When introducing division of binomials, a single digit divisor division problem was worked to show similarities. Also, the necessity of descending order of the divisor and dividend was pointed out.

Day 21: **Zero and Negative Integers As Exponents**

Day 22: **Review**
Bonus Questions

Day 23: **Chapter 5 Test**

Homework due for Chapter 5.

Day 24: **Factoring by Using the Distributive Property**
Factoring the Difference of Two Squares
Factoring Trinomials of the Form $x^2 + bx + c$

Day 25: **Factoring Trinomials of the Form $ax^2 + bx + c$**

A. An alternative technique for factoring the above:

1. Factors of the product of 1st and last terms that add to middle term
2. Put "a" in each grouping with above factors
3. Reduce binomial if possible

Example: $3y^2 - 2y - 8$

Step 1: $\begin{cases} \text{Product} = -24 \\ \text{Sum} = -2 \\ \text{Factors} = -6 \text{ and } 4 \end{cases}$

Step 2: $(3y - 6)(3y + 4)$

Step 3: $(y - 2)(3y + 4)$

Day 26: **Factoring, Solving Equations and Problem Solving for Chapter 6**

Day 27: **Review**
Bonus Questions

Day 28: **Chapter 6 Test**

Homework due for Chapter 6

Day 29: **Review for Final**

Day 30: **FINAL**

HANDOUT A

PIKES PEAK COMMUNITY COLLEGE

SYLLABUS
MAT 020
DAYS: ____________
TIME: ____________

INSTRUCTOR:
TELEPHONE:

COURSE MATERIALS

Textbook: Elementary Algebra for College Students;
Jerome Kaufmann
Supplies: Notebook to organize homework, quizzes and notes
Calculator (optional)

OBJECTIVE

The student will be able to use the correct order of operations to simplify and evaluate algebraic expressions using real numbers. The student will be able to solve first degree equations and second degree equations by factoring. The student will also be able to solve word problems that involve first and second degree equations. In addition, we will incorporate all the above with "work" related problems.

GENERAL INFORMATION

ATTENDANCE: I assume my students are adults serious about learning and therefore, will be punctual and consistent in attendance.

SPECIAL HELP: I will use the room after class on Monday for those needing extra help. You may, also, want to take advantage of PPCC's lab located in A-316 for free tutoring.

ASSIGNMENTS: Homework will be assigned every class and expected to be completed before the test is taken for that chapter.

GRADING:

Percent	Points
93-100 = A	1023-1100 = A
84-92 = B	924-1022 = B
75-83 = C	825- 923 = C
70-74 = D	770- 824 = C
69-0 = U	0-769 = U

The homework assignments must be submitted when due or earlier. No late work will be graded. A zero is recorded for any missed assignment. 50 points will be given for those that have been completed and turned in on time (before each test).

In-class quizzes must be taken when scheduled or earlier. Each is worth 100 points, however, a grade of zero is recorded for any missed quiz. The final will be cumulative and also worth 100 points.

Bonus questions will be collected at the end of each chapter. A total of eight are required and additional questions will be accepted for extra credit. Each satisfactory question is worth 5 points.

I will also collect all the notes on the final day. They will be worth up to 60 points. (10 points per chapter)

Classroom Conduct:

1. Smoking is prohibited. Food and drinks are allowed.
2. Polite, respectful behavior is expected of every member of the class.

SYLLABUS SCHEDULE

We may vary slightly, timewise.

Session 1:	Pretest, 1.1, 1.2
Session 2:	1.3, 1.4
Session 3:	1.5
Session 4:	Review and work problems
Session 5:	**Chapter 1 Quiz. Homework Due.**
Session 6:	2.1-2.3
Session 7:	2.4, 2.5
Session 8:	Review and work problems
Session 9:	Chapter 2 Quiz. Homework Due.
Session 10:	3.1, 3.2
Session 11:	3.3, 3.4
Session 12:	3.5, 3.6
Session 13:	Review and work problems
Session 14:	**Chapter 3 Quiz. Homework Due.**
Session 15:	4.1- 4.3
Session 16:	4.4, 4.5
Session 17:	Review and work problems
Session 18:	**Chapter 4 Quiz. Homework Due.**
Session 19:	5.1-5.3

Session 20: 5.4, 5.5
Session 21: 5.6
Session 22: Review and work problems
Session 23: **Chapter 5 Quiz. Homework Due.**
Session 24: 6.1-6.3
Session 25: 6.4
Session 26: 6.5
Session 27: Review and work problems
Session 28: **Chapter 6 Quiz. Homework Due.** (Have review ready)

Session 29: Review for Final.
Session 30: **FINAL**

HANDOUT B

PORTION OF EXAMPLE SPREADSHEET

Formulas Needed:

Inventory Turns = subtotal vos/((Beg inv + End inv)/2)
Days of Supply = ((Beg inv + End inv)/2) / (sub-total vos/250)

Fictional Data:

	Jan	Feb	Mar
Beg inv	50	37	45
Subtotal vos	70	122	1000
Ending inv	37	45	40

Find Inv Turns and Days of Supply for each month.

Inv Turns: ______ ______ ______

Days of Supply: ______ ______ ______

TEST P
Math Pre-test, Part B

Name____________________

Do all work on this page. Reduce fractions when possible. Do not use a calculator.

____________1. $\frac{3}{8} + \frac{5}{6}$

2. $\begin{array}{r} 7\frac{1}{2} \\ -3\frac{3}{4} \\ \hline \end{array}$

3. $2\frac{2}{3} \cdot 3\frac{1}{2}$

____________2.

____________3.

____________4. $\frac{6}{7} \div \frac{3}{4}$

5. 18.2 - 7.37

6. 0.87 x 0.9
(round answer to hundredths)

____________5.

____________6.

____________7. Divide: 4.5 ÷ 0.05

8. What is 8% of $95?

____________8.

____________9. Write the decimal numeral for five thousand, two hundred eighty and sixteen thousandths.

10. A student got 18 question correct on a 24 question test. What percent did he get right?

____________10.

____________11. Change $\frac{3}{8}$ to an equvalent three place decimal numeral.

____________12. A man bought three shirts at $13.95 each (tax included) and two sweaters at $19.48 each. How much change should he receive, if he gave the clerk a $100 bill?

TEST P
Math Pre-test, Part c   Name____________________

____________1. Evaluate: $7x^2 - 9y$ for $x = -2$ and $y = -4$.

Simplify:

____________2. $5(2x - 3) - 7(x - 9)$ 3. $\frac{6xy^2}{9y} \div \frac{15y}{18x^2}$

____________3.

____________4. $\frac{8}{x} + \frac{5}{2y}$ 5. $(4a + 5)(3a - 8)$ 6. $\frac{24x^5 - 16x^3 - 32x^2}{4x^2}$

____________5.

____________6.

Factor completely.

____________7. $8x^3 - 6x^2$ 8. $x^2 - x - 6$ 9. $2x^2 - 9x - 5$

____________8.

____________9.

Solve each equation for x.

____________10. $-3(x + 6) = 5x - 3$ 11. $3x + 8 = 10 - 5x - 6$

____________11.

____________12. The length of a rectangle is 3 inches more than twice its width. If its perimeter is 60 inches, find its length and width.
(width)
____
(length)

Math 020 Name ________________________

Chapter 1, [illegible]

Directions: Solve below on this sheet. Submit answers in simplest form, at the left.

(. Simplify:

________1. 37-28 + 6 2. 9(7+6) 3. 81 - 8(9) 4. 9 + (-17)

________2.

________3.

________4.

________5. 300 - 5[7(12-5)] 6. $\frac{40-16}{8} + \frac{64+36}{4}$ 7. 9(13-4)-7(29-21)

________6.

________7.

________8. 4(-9) - (-6) 9. -26 + (-18) 10. -24 - 39 11. 47 - 18

________9.

________10.

________11.

________12. -16 - (-7) 13. -4 -5 + 8 - 9 14. 7(-6) 15. $\frac{144}{-12}$

________13.

________14.

________15.

________16. $\frac{0}{-9}$ 17. 7(-5) + 5(-9) 18. $\frac{16 + (-32)}{-8}$ 19. $\frac{-962}{-37}$

________17.

________18.

________19.

________20. 9a-15a 21. 12x-9x - 8x 22. 7d - d-13d 23. -7x-7y-6x-y

________21.

________22.

________23.

Math 020 Unit II
Test T-1

Name____________________
Instructor____________________

I. Perform the indicated operations. Leave all answers in their simplest form.

____________ a. $\left(\frac{7}{8x}\right)\left(\frac{9y}{35y^2}\right)$

____________ b. $\frac{2}{3} + \frac{-3}{7}$

____________ c. $\frac{3}{x^2} - \frac{8}{xy}$

____________ d. $\left(\frac{-5x}{16y}\right)\left(\frac{8y}{-7x}\right)$

____________ e. $\frac{2xy}{3x^2} \div \frac{-18xy^2}{5x}$

____________ f. $yz \cdot \frac{1}{y}$

____________ g. $\frac{7}{y} - \frac{5}{3y}$

____________ h. $\frac{18xy^2}{96xy}$ (reduce)

____________ i. $3.2 + (-9.3)$

____________ j. $(-.8)(.14)$

____________ k. $-2.94 \div .6$

____________ l. $8.2 - (-1.6)$

Simplify.

____________ a. $\frac{3}{4} \div \frac{9}{11} + \left(\frac{-1}{3}\right)\left(\frac{1}{4}\right)$

____________ b. $1.17 + (.04)(.3) \div .6$

____________ c. $(.2)^2 + (.4)^2 - (.7)^2$

____________ d. $3x^3 - 8x^3 + 7x^3$

____________ e. $8xy - 9xy - xy$

MATH 020, TEST Ch 3
Form T-1, (Kaufmann, 2 nd ed)

Name______________________

Instructor________________

SOLVE FOR THE VARIABLE. SHOW ALL WORK.

1. $16 = 2x + 4$ 2. $x + .26 = .17$

____________ 2.

____________ 3. $\frac{x}{9} = -7$ 4. $\frac{-3}{7}x = 14$

____________ 4.

____________ 5. $20 - 7x = -22$ 6. $x - 1 = 3x + 7$

____________ 6.

____________ 7. $7x - 1 = 2x + 9$ 8. $2x - 3 - x = 17$

____________ 8.

____________ 9. $5(x + 3) - 3(x - 1) = 14$ 10. $-3(x - 4) = 5x - 1$

____________ 10.

____________ 11. $\frac{x}{5} - \frac{x}{2} = 1$ 12. $.08x + .09(x + 1000) = 60$

____________ 12.

____________ 13. $x - .35x = 150$ 14. $\frac{x + 2}{2} - \frac{x + 3}{5} = \frac{3}{10}$

____________ 14.

____________ 15. 75% of what number is 45? 16. 80 is what percent of 64?

____________ 16.

______________17. $x - 2 = -11$

18. $\frac{2}{3}x - 1 = \frac{3}{5}x + \frac{1}{4}$

______________18.

______________19. $.7x - 1.2 = .8x + 3.1$

20. $\frac{-3}{2x-1} = \frac{-2}{5x+2}$

______________20.

______________21. A retailer has some ties costing $5 each. He wants to sell them at a profit of 25% of the cost. What should be the selling price of the ties?

______________22. Jerry has 21 coins, consisting of nickels and dimes, amounting to $1.65. How many nickels and dimes does he have?

______________23. Three less than 5 times a certain number is equal to 13 less than seven times the same number. Find the number.

______________24. Find two consecutive integers such that the first plus five times the second is 125.

______________25. Sue invested a certain amount of money at 8% interest and $300 more than that amount at 9%. Her total yearly interest was $231. How much did she invest at each rate?

TEST CH. 4 (KAUFMANN)
FORM TE-1

INSTRUCTOR:____________________
HOUR:____________________

I. Evaluate the formula using the specified value for each variable.

1. $C = \frac{5}{9}(F - 32)$; $C = 20$

2. $C = 2\pi r$; $\pi = 3.14$, $C = 21.98$

II. Solve each equation for the indicated variable.

3. $V = \frac{1}{3}Bh$, for B

4. $ax - by - c = 0$, for "y"

5. $\frac{x}{a} + \frac{y}{2} = 1$, for "x"

6. $2x - 3y + 6 = 4y + 3x - 9$, for "y"

III. Solve each inequality and graph the solution set.

7. $x - 7 < -12$

8. $.3x - .6 - .5x \geq -10$

14. A car leaves town traveling 50 mph. Two hours later a freight train leaves from the same place traveling 75 mph. How long will it take the train to overtake the car?

15. Jan is half as old as her brother Joe. Six years ago Joe was three times older than Jan. How old is Jan now?

16. A triangle is to be drawn with one angle 12 degrees greater than another, and the third angle 12 degrees less than the sum of the other two. Determine the measure of the smallest angle.

17. Use $S = 2\pi r^2 + 2\pi rh$ to find the total surface area of a right circular cylinder having a radius of 4 inches and a height of 6 inches. (use 3.14 for π)

______________18a. For a circle with a diameter of 10 inches and $\pi = 3.14$
find a) the circumference ($C = 2r\pi$)
b) the area

______________b.

19. The width of a rectangular garden is 3 feet less than its length. If the perimeter is 30 feet, what are the dimensions?

20. Graph the following compound inequalities:

a) $x > 1$ and $x \le 4$

b) $x \le -2$ or $x \ge 1$

Mat 020, ([illegible])
Ch 5 Test, Form T-1

Name________________________________
Instructor____________________________

A. Determine the degree of this polynomial.

(Do Not Do ~~1) $4x^2y - 3y$~~

B. Add.

________________ 2) $3x^2 - 7x - 1$, $3x - 4$, and $-5x^2 - 2x - 7$

________________ 3) $3x^2 - 6x - 9$ and $8x^2 - 7x - 2$

C. Subtract.

________________ 4) $-4x + 7$ from $3x - 8$

________________ 5) $4a^2 - 7a + 9$ from $3a^2 - 2a - 14$

D. Perform the indicated operations.

________________ 6) $(3x^2 - 4x + 5) + (-8x^2 + 2x - 1)$

________________ 7) $(-3y^2 + 2y - 7) - (y^2 - y + 4)$

________________ 8) $(8x^2 + 4x - 2) + (-5x^2 - 7x - 3) - (8x - 9)$

E. Remove parentheses and simplify.

________________ 9) $3(2x - 1) + 4(x + 3) - 5(x + 4)$

________________ 10) $5(x - y + z) - 7(x + y - z)$

F. Multiply. Leave answers in simplest form.

________________ 11) $(3x^2)(7x^4)$

________________ 12) $(-6x^3)(9x^5)$

________________ 13) $(-3xy^2)^2$

________________ 14) $2x(3x - 1)$

________________ 15) $(-5x^3)(5x - 1)$

________________ 16) $(x + 9)(x + 8)$

________________ 17) $(y - 5)(y + 3)$

________________ 18) $(2x - 1)(3x + 4)$

________________ 19) $(2x - 3)^2$

________________ 20) $(x + 4)(x^2 - 2x + 3)$

86

Math 020, Ch 6
Form C, Kaufmann 3rd ed.

Name ____________________

Instructor ____________________

For Problems 1-10, factor each expression completely.

____________________ 1. $x^2+5x-24$

____________________ 2. x^3-49x

____________________ 3. $x^2+3x-108$

____________________ 4. $5x^2+50$

____________________ 5. $24n^2+26n-15$

____________________ 6. $24x^2y-32xy^2$

____________________ 7. $10x^2+37x-12$

____________________ 8. $n^2+9n+36$

____________________ 9. $2x^3+6x^2-36x$

____________________ 10. $xy-5y-2x+10$

For Problems 11-20, solve each equation.

____________________ 11. $2x^2 = 72$

____________________ 12. $x^2+7x-60 = 0$

____________________ 13. $3n^2 = -21n$

____________________ 14. $(6x-1)(4x+5) = 0$

____________________ 15. $(x-4)(x+8) = 13$

____________________ 16. $4t^3 = 36t$

____________________ 17. $-2(x-1)-x(x-1) = 0$

____________________ 18. $9n^2-12n+4 = 0$

____________________ 19. $7x^2+26x = 8$

____________________ 20. $-y^2+7y+8 = 0$

For Problems 21-25 set up an equation and solve the problem.

________________21. One leg of a right triangle is 3 feet longer than the other leg. The hypotenuse is 6 feet longer than the shorter leg. Find the length of the hypotenuse.

________________22. Find two consecutive integers whose product is 132.

________________23. The combined area of two squares is 160 sq. cm. Each side of the larger square is three times as long as the side of the smaller square. Find the length of the sides of each square.

________________24. The length of a rectangle is 3 inches more than the width. If the area is 70 sq. inches, find the dimensions of the rectangle.

________________25. The square of a number equals 5 times the number. Find the number.

MATH 020
FINAL (CH. 1 - 6)

Name__________________

Simplify the following:

__________1. $-5 - 2(8 \div 2^2 \bullet 2 - 1)$

__________2. $-3(x - 2) - (2x - 3) - x$

__________3. $\frac{6x}{-5y^2} \div \frac{2x}{-y}$

__________4. $\frac{x}{2y} - \frac{2x}{3y}$

__________5. $n - 1/2n + 2/3n$

__________6. $(3xy)(-xy)(-x^2)$

__________7. $\frac{-18x^3y}{-6xy}$

__________8. $(-2)^3 - (-2)^2$

__________9. $(-2x^3)^2$

__________10. $(2x - 3)(x + 1)$

__________11. $(x + 5)^2$

__________12. 5^{-2}

__________13. $2.3(10^{-3})$

__________14. Subtract $2x - 3$ from $5x + 1$

__________15. Evaluate using $x = 2;\ y = -3$

$$-2x + \frac{x - y}{x + y}$$

Factor Completely:

__________16. $2x^2 + x - 6$

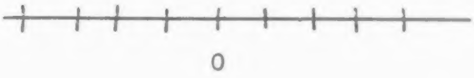
__________17. $4x^2 - 1$

__________18. $2x^3 - 8x^2$

__________19. Simplify and Express using positive exponents only:

$$\frac{4xyz^{-1}}{2y^{2}z^{-3}}\ ^{-2}$$

20. Sketch and label the graph for $x \leq -2$



Solve for x:

__________21. $4(x + 3) = -2(x - 3)$

__________22. $.4x - 2 = .8 - x$

__________23. $\frac{7}{8} = \frac{x}{x - 1}$

__________24. $2x - 3x = 7$

__________25. $3x - 4 - 4x > 3$

__________26. $x^2 = 5x$

__________27. $x^2 + 32 = 12x$

Solve the following word problems. To get full credit, you must: 1) define the unknown, 2) write the equation, 3) solve and answer all questions.

__________28. The width of a rectangle is 3 cm less than its length. The area of the rectangle is 54 square centimeters. Find the width and length.

__________29. Sue has $1.35 in nickels and dimes. She has 6 more nickels than dimes. How many of each does she have?

__________30. Two subtracted from nine times a certain number is the same as 14 added to seven times the number. Find the number.

__________31. How many liters of a 10% salt solution must be mixed with 15 liters of a 40% salt solution to obtain a 20% salt solution?

__________32. 26 is what percent of 20?

__________33. $(6x^2 - x - 2) \div (2x + 1)$

MATHEMATICS SKILLS FOR THE WORKPLACE

PUEBLO COMMUNITY COLLEGE
M. D. VICE

TABLE OF CONTENTS

Page

Abstract 1
Course Objectives 2
Time and Materials 3
Required Mathematical Concepts 4
Course Plan 5
Student Variables Influencing Learning 6
Teaching Variables Influencing Learning 7
Task Variables Influencing Learning 8
Benefits of Mathematical Competence 9
Positive Classroom Activities 10
Negative Classroom Activities 11
Conclusions 12
Position Paper 13
Course Syllabus 17
Acknowledgements 180

WORKPLACE MATH

Abstract

Students involved in learning activities for the workplace will find that a knowledge of basic mathematics skills is extremely useful and will better prepare them for the jobs they take in business and industry. Students in workplace learning may develop basic skills required for advancement in their present job or acquire additional skills to perform the functions of their assignment. The material in this unit is designed to provide the student with valuable experience and necessary practice in solving typical mathematical problems. The content of this course is suitable for a range of vocational skills and is equally suitable to serve various levels of mathematical capability. Problems included in this course can be related to numerous job application. The student and the instructor will be able to apply exercises to specific occupations.

OBJECTIVES

Course Objectives: Mathematics - WPL

At the completion of this course the student should be able to:

- Demonstrate a strong foundation in math facts
- Follow logical procedures in problem solving
- Apply mathematical concepts when working with decimals
- Understand fraction forms and simplify fraction problems
- Understand and apply standard and metric measurements
- Demonstrate a basic understanding of powers and roots
- Apply geometric functions in problem solving
- Use algebraic functions in solving work problems
- Apply all functions in the work place

TIME AND MATERIALS

Timing

There will be two meetings a week for eight weeks which will equal 40 hours of instruction.

Each class period will be divided into the following:

1. Presentation
2. Demonstration
3. Application
4. Evaluation

Materials

Course Syllabus
Paper and Pencil
Compass
Calculator
Notebook
Ruler

REQUIRED MATHEMATICAL CONCEPTS

- Whole Numbers
- Decimals
- Fractions
- Ratio and Proportion
- Percents
- Measurements
- Graphs, Statistics, and Probability
- Numeration
- Geometry
- Algebra

COURSE PLAN

Daily Plan for Class

Introduction	5 Minutes
Presentation (Instruction)	45 Minutes
Demonstration (Student)	45 Minutes
In-class work period	35 Minutes
Summary and evaluation	20 Minutes
TOTAL	150 Minutes

Total Program Plan

Presentation (Instructor)	14 Hours
Demonstration (Instructor & Student)	12 Hours
In-class work (Student)	9 Hours
Summary and evaluation (Inst)	5 Hours
TOTAL	40 Hours

STUDENT VARIABLES INFLUENCING LEARNING

- Prior Knowledge
- Prior Experience
- Special Aptitudes
- Motivation
    - Alertness
    - Attention
    - Persistence
- Work Schedule
- Job Responsibility

TEACHING VARIABLES INFLUENCING LEARNING

- Personnel
- Training and Supervision
- Curriculum
  - Goals
  - Objectives
- Teaching Style
  - Motivation
  - Pacing of Instruction
  - Re-enforcement
- Time
- Structure
- Evaluation
  - Feedback
  - Remediation
  - Observation
  - Testing

TASK VARIABLES INFLUENCING LEARNING

- Content - What to Teach
- Sequence - When to Teach
- Method - How to Teach

BENEFITS OF MATHEMATICAL COMPETENCE

- Personal Improvement
- Advancement in Job
- Mastery of Essential Skills
- Critical Thinking
- Problem Solving
- Further Educational Opportunities
- Ability to Follow Directions
- Creative Application of Skills
- Application to Workplace

POSITIVE CLASSROOM ACTIVITIES

- Discussing or Reviewing Classwork or Homework
- Introducing New Concepts
- Student Demonstration of Work
- Focusing Instruction on a Small Group or Total Group (not an individual)
- Positive Corrective Feedback to Incorrect Responses
- Using Short Quizzes
- Consistency in Sequence of Instruction

NEGATIVE CLASSROOM ACTIVITIES

- Teacher doing Organization or Management Tasks during Class Time
- Too Much Class Time for Written Assignments
- Too Much Time Spent with One Student
- Intrusions
- Uninvolved Students
- Misbehavior or Negative Interactions

CONCLUSIONS

- Teachers need to be interactive and directly involved with students to keep them on task.
- Teachers should distribute questions or problems to all members of the class and be supportive and guiding in their feedback.
- Teachers should offer several activities during a class period so that students can develop speaking, reading, listening, and writing skills. This helps students integrate information.
- The classroom must have minimal distractions or intrusions.
- Effective schools are friendly, teachers are available to students, and student success is recognized.

POSITION PAPER

NATIONAL COUNCIL OF SUPERVISORS OF MATHEMATICS POSITION PAPER ON BASIC MATHEMATICAL SKILLS

INTRODUCTION

The currently popular slogan "Back to the Basics" has become a rallying cry of many who perceive a need for certain changes in education. The result is a trend that has gained considerable momentum and has initiated demands for programs and evaluations which emphasize narrowly defined skills.

Mathematics educators find themselves under considerable pressure from boards of education, legislatures, and citizens' groups who are demanding instructional programs which will guarantee acquisition of computational skills. Leaders in mathematics education have expressed a need for clarifying what are the basic skills needed by students who hope to participate successfully in adult society.

The narrow definition of basic skills which equates mathematical competence with computational ability has evolved as a result of several forces:

1. Declining scores on standardized achievement tests and college entrance examinations;
2. Reactions to the results of the National Assessment of Educational Progress;
3. Rising costs of education and increasing demands for accountability;
4. Shifting emphasis in mathematics education from curriculum content to instructional methods and alternatives;
5. Increased awareness of the need to provide remedial and compensatory programs;
6. The widespread publicity given to each of the above by the media.

This widespread publicity, in particular, has generated a call for action from governmental agencies, educational organizations, and community groups. In responding to these calls, the National Institute of Education adopted the area of basic skills as a major priority. This resulted in a Conference on Basic Mathematical Skills and Learning, held in Euclid, Ohio, in October, 1975.

The National Council of Supervisors of Mathematics (NCSM), during the 1976 Annual Meeting in Atlanta, Georgia, met in a special session to discuss the Euclid Conference Report. More than 100 members participating in that session expressed the need for a unified position on basic mathematical skills which would enable them to provide more effective leadership within their respective school systems, to give adequate rationale and direction in their tasks of implementing basic mathematics programs, and to appropriately expand the definition of basic skills. Hence, by an overwhelming majority, they mandated the NCSM to establish a task force to formulate a position on basic mathematical skills. This statement is the result of that effort.

RATIONALE FOR THE EXPANDED DEFINITION

There are many reasons why basic skills must include more than computation. The present technological society requires daily use of such skills as estimating, problem solving, interpreting data, organizing data, measuring, predicting, and applying mathematics to everyday situations. The changing needs of society, the explosion of the amount of quantitative data, and the availability of computers and calculators demand a redefining of the priorities for basic mathematics skills. In recognition of the inadequacy of computation alone, NCSM is going on record as providing both a general list of basic mathematical skills and a clarification of the need for such an expanded definition of basic skills.

Any list of basic skills must include computation. However, the role of computational skills in mathematics must be seen in the light of the contributions they make to one's ability to use mathematics in everyday living. In isolation, computational skills contribute little to one's ability to participate in mainstream society. Combined effectively with the other skill areas, they provide the learner with the basic mathematical ability needed by adults.

DEFINING BASIC SKILLS

The NCSM views basic mathematical skills as falling under ten vital areas. The ten skill areas are interrelated and many overlap with each other and with other disciplines. All are basic to pupils' development of the ability to reason effectively in varied situations.

This expanded list is presented with the conviction that mathematics education must not emphasize computational skills to the neglect of other critical areas of mathematics. The ten components of basic mathematical skills are listed below, but the order of their listing should not be interpreted as indicating either a priority of importance or a sequence for teaching and learning.

Furthermore, as society changes our ideas about which skills are basic also change. For example, today our students should learn to measure in both the customary and metric systems, but in the future the significance of the customary system will be mostly historical. There will also be increasing emphasis on when and how to use hand-held calculators and other electronic devices in mathematics.

TEN BASIC SKILL AREAS

Problem Solving

Learning to solve problems is the principal reason for studying mathematics. Problem solving is the process of applying previously acquired knowledge to new and unfamiliar situations. Solving word problems in texts is one form of problem solving, but students also should be faced with non-textbook problems. Problem-solving strategies involve posing questions, analyzing situations, translating results, illustrating results, drawing diagrams, and using trial and error. In solving problems, students need to be able to apply the rules of logic necessary to arrive at valid conclusions. They must be able to determine which facts are relevant. They should be unfearful of arriving at tentative conclusions and they must be willing to subject these conclusions to scrutiny.

Applying Mathematics to Everyday Situations

The use of mathematics is interrelated with all computation activities. Students should be encouraged to take everyday situations, translate them into mathematical expressions, solve the mathematics, and interpret the results in light of the initial situation.

Alertness to the Reasonableness of Results

Due to arithmetic errors or other mistakes, results of mathematical work are sometimes wrong. Students should learn to inspect all results and to check for reasonableness in terms of the original problem. With the increase in the use of calculating devices in society, this skill is essential.

Estimation and Approximation

Students should be able to carry out rapid approximate calculations by first rounding off numbers. They should acquire some simple techniques for estimating quantity, length, distance, weight, etc. It is also necessary to decide when a particular result is precise enough for the purpose at hand.

Appropriate Computational Skills

Students should gain facility with addition, subtraction, multiplication, and division with whole numbers and decimals. Today it must be recognized that long, complicated computations will usually be done with a calculator. Knowledge of single-digit number facts is essential and mental arithmetic is a valuable skill. Moreover, there are everyday situations which demand recognition of, and simple computation with, common fractions.

Because consumers continually deal with many situations that involve percentage, the ability to recognize and use percents should be developed and maintained.

Geometry

Students should learn the geometric concepts they will need to function effectively in the 3-dimensional world. They should have knowledge of concepts such as point, line, plane, parallel, and perpendicular. They should know basic properties of simple geometric figures, particularly those properties which relate to measurement and problem-solving skills. They also must be able to recognize similarities and differences among objects.

Measurement

As a minimum skill, students should be able to measure distance, weight, time, capacity, and temperature. Measurement of angles and calculations of simple areas and volumes are also essential. Students should be able to perform measurement in both metric and customary systems using the appropriate tools.

Reading, Interpreting, and Constructing Tables, Charts, and Graphs

Students should know how to read and draw conclusions from simple tables, maps, charts, and graphs. They should be able to condense numerical information into more manageable or meaningful terms by setting up simple tables, charts, and graphs.

Using Mathematics to Predict

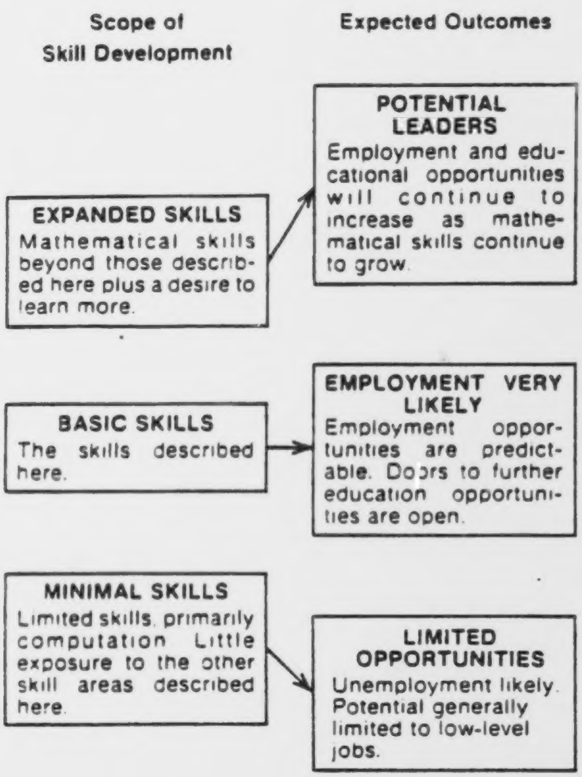
Students should learn how elementary notions of probability are used to determine the likelihood of future events. They should learn to identify situations where immediate past experience does not affect the likelihood of future events. They should become familiar with how mathematics is used to help make predictions such as election forecasts.

Computer Literacy

It is important for all citizens to understand what computers can and cannot do. Students should be aware of the many uses of computers in society, such as their use in teaching/learning, financial transactions, and information storage and retrieval. The "mystique" surrounding computers is disturbing and can put persons with no understanding of computers at a disadvantage. The increasing use of computers by government, industry, and business demands an awareness of computer uses and limitations.

BASIC SKILLS AND THE STUDENT'S FUTURE

Anyone adopting a definition of basic skills should consider the "door-opening/door-closing" implications of the list. The following diagram illustrates expected outcomes associated with various amounts of skill development.



Scope of Skill Development

Expected Outcomes

EXPANDED SKILLS Mathematical skills beyond those described here plus a desire to learn more.

POTENTIAL LEADERS Employment and educational opportunities will continue to increase as mathematical skills continue to grow.

BASIC SKILLS The skills described here.

EMPLOYMENT VERY LIKELY Employment opportunities are predictable. Doors to further education opportunities are open.

MINIMAL SKILLS Limited skills, primarily computation. Little exposure to the other skill areas described here.

LIMITED OPPORTUNITIES Unemployment likely. Potential generally limited to low-level jobs.

MINIMUM ESSENTIALS FOR HIGH-SCHOOL GRADUATION

Today some school boards and state legislatures are starting to mandate mastery of minimum essential skills in reading and mathematics as a requirement for high-school graduation. In the process, they should consider the potential pitfalls of doing this without an appropriate definition of "basic skills." If the mathematics requirements are set inordinately high, then a significant number of students may not be able to graduate. On the other hand, if the mathematics requirements are set too low and mathematical skills are too narrowly defined, the result could be a sterile mathematics program concentrating exclusively on learning of low-level mathematical skills. This position paper neither recommends nor condemns minimal competencies for high-school graduation. However, the ten components of basic skills stated here can serve as guidelines for state and local school systems that are considering the establishment of minimum essential graduation requirements.

DEVELOPING THE BASIC SKILLS

One individual difference among students is style or way of learning. In offering opportunities to learn the basic skills, options must be provided to meet these varying learning styles. The present "back-to-basics" movement may lead to an emphasis on drill and practice as a way to learn.

Certainly drill and practice is a viable option, but it is only one of many possible ways to bring about learning and to create interest and motivation in students. Learning centers, contracts, tutorial sessions, individual and small-group projects, games, simulations and community-based activities are some of the other options that can provide the opportunity to learn basic skills. Furthermore, to help students fully understand basic mathematical concepts, teachers should utilize the full range of activities and materials available, including objects the students can actually handle.

The learning of basic mathematical skills is a continuing process which extends through all of the years a student is in school. In particular, a tendency to emphasize computation while neglecting the other nine skill areas at the elementary level must be avoided.

EVALUATING AND REPORTING STUDENT PROGRESS

Any systematic attempt to develop basic skills must necessarily be concerned with evaluating and reporting pupil progress.

In evaluation, test results are used to judge the effectiveness of the instructional process and to make needed adjustments in the curriculum and instruction for the individual student. In general, both educators and the public have accepted and emphasized an overuse of and overconfidence in the results of standardized tests. Standardized tests yield comparisons between students and can provide a rank ordering of individuals, schools, or districts. However, standardized tests have several limitations including the following:

a. Items are not necessarily generated to measure a specific objective or instructional aim.

b. The tests measure only a sample of the content that makes up a program; certain outcomes are not measured at all.

Because they do not supply sufficient information about how much mathematics a student knows, standardized tests are not the best instruments available for reporting individual pupil growth. Other alternatives such as criterion tests or competency tests must be considered. In criterion tests, items are generated which measure the specific objectives of the program and which establish the student's level of mastery of these objectives. Competency tests are designed to determine if the individual has mastered the skills necessary for a certain purpose such as entry into the job market. There is also need for open-ended assessments such as observations, interviews, and manipulative tasks to assess skills which paper and pencil tests do not measure adequately.

Reports of pupil progress will surely be made. But, while standardized tests will probably continue to dominate the testing scene for several years, there is an urgent need to begin reporting pupil progress in other terms, such as criterion tests and competency measures. This will also demand an immediate and extensive program of inservice education to instruct the general public on the meaning and interpretation of such data and to enable teachers to use testing as a vital part of the instructional process.

Large scale testing, whether involving all students or a random sample, can result in interpretations which have great influence on curriculum revisions and development. Test results can indicate, for example, that a particular mathematical topic is being taught at the wrong time in the student's development and that it might better be introduced later or earlier in the curriculum. Or, the results might indicate that students are confused about some topic as a result of inappropriate teaching procedures. In any case, test results should be carefully examined by educators with special skills in the area of curriculum development.

CONCLUSION

The present paper represents a preliminary attempt by the National Council of Supervisors of Mathematics to clarify and communicate its position on basic mathematical skills. The NCSM position establishes a framework within which decisions on program planning and implementation can be made. It also sets forth the underlying rationale for identifying and developing basic skills and for evaluating pupils' acquisition of these competencies. The NCSM position underscores the fundamental belief of the National Council of Supervisors of Mathematics that any effective program of basic mathematical skills must be directed not "back" but *forward* to the essential needs of adults in the present and future.

You are encouraged to make and distribute copies of this paper.

The NCSM position paper was prepared pursuant to a contract with the National Institute of Education, U.S. Department of Health, Education and Welfare. Contractors undertaking such projects under government sponsorship are encouraged to express freely their judgment in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official National Institute of Education position or policy.

NATIONAL COUNCIL OF SUPERVISORS OF MATHEMATICS
c/o Ross Taylor
Minneapolis Public Schools
807 Broadway N. E.
Minneapolis, Minnesota 55413

NCSM

January, 1977

MEMBERS OF NCSM TASK FORCE ON BASIC MATHEMATICAL SKILLS

Mildred Daniels	Detroit Public Schools, Detroit, MI
David Dye	Minnesota Department of Education, St. Paul, MN
Jane Donnelly Gawronski	San Diego County Department of Education, San Diego, CA
William J. Geppert[1]	Delaware Department of Public Instruction, Dover, DE
Peggy A. House	University of Minnesota, Minneapolis, MN
Elgin Schilhab	Austin Independent School District, Austin, TX
Glyn Sharpe	Jefferson County Public Schools, Lakewood, CO
Albert P. Schulte	Oakland Public Schools, Pontiac, MI
Dorothy Strong	Chicago Board of Education, Chicago, IL
B. Ross Taylor[2]	Minneapolis Public Schools, Minneapolis, MN
Alex Tobin[3]	School District of Philadelphia, Philadelphia, PA
Kay Tobin	Lexington Public Schools, Lexington, MA
Edward Esty[4]	National Institute of Education, Washington, D. C.

[1] President, Association of State Supervisors of Mathematics
[2] NCSM Basic Skills Task Force Chairperson
[3] President, NCSM
[4] Resource Person, National Institute of Education

COURSE SYLLABUS

PUEBLO COMMUNITY COLLEGE

COURSE SYLLABUS

TITLE OF COURSE WPL Mathematics

PREFIX/NUMBER Steck-Vaughn

INSTRUCTOR __________

DAYS/TIME __________

BUILDING/ROOM __________

INSTRUCTOR OFFICE HOURS __________

M __________

T __________

W __________

R __________

F __________

PUEBLO COMMUNITY COLLEGE

COURSE SYLLABUS

1. TITLE OF COURSE: WPL Mathematics
PREFIX/NUMBER:

2. CO-REQUISITES: None

3. RESOURCES NEEDED:

TEXT: GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

SUPPLIES:

4. COURSE GOAL: Attached

5. COURSE OBJECTIVES: Attached

COURSE OUTLINE

MATHEMATICS

GOAL:

The student will develop and demonstrate a understanding of the fundamental principles of mathematics as well as a proficiency in applying mathematical theory.

OBJECTIVES AND METHODS

Each student will be given a diagnostic test to determine their strengths and weaknesses in each content area of the mathematics curriculum.

The student will demonstrate their knowledge and ability in each area of mathematics by passing a proficiency test with 80% accuracy or above on either an instructor-developed assessment or a standardized test.

(1) Arithmetic

The student will develop skills of measurement, number relationship, and data analysis designed to help in solving mathematical problems of everyday life.

The student will demonstrate a proficiency in each of the following areas by passing each practice exercise with at least 80% accuracy:

a. Whole number operations
   1. reading and writing large numbers
   2. applying place value, expanded notation, and positional notation in base 10
   3. addition, subtraction, multiplication, and division in horizontal and vertical positions
   4. solving problems
   5. determine averages

b. Fractions
   1. terminology and different types
   2. reducing
   3. raising to higher terms
   4. changing to improper, mixed, or whole numbers
   5. addition/subtraction with like or unlike denominators
   6. multiplication/division
   7. comparison of fractions
   8. ratios, ordered pairs, and proportions
   9. solving word problems

c. Decimals
   1. reading, writing, rounding, comparing, and rewriting decimals
   2. changing decimals to fractions and fractions to decimals
   3. addition/subtraction in both horizontal and vertical positions

4. multiplication and placement of decimal point properly
5. division by decimals and whole numbers and the proper placement of the decimal point
6. multiplication/division by powers of 10
7. solving word problems

d. Percents
   1. understanding the meaning of percent
   2. changing percents to decimals or fractions
   3. determine the percent of a number
   4. determine the number when the percent is given
   5. finding percent over 100%
   6. determine percent increase or decrease
   7. solving word problems

e. Graphs
   1. circle
   2. bar
   3. line
   4. pressure

(2) Algebra

The student will develop basic algebra skills where setting up and solving equations, understanding inequalities, and linear functions will be studied.

The student will demonstrate a proficiency in each of the following concept areas by passing each practice exercise with at least 80% accuracy:

a. Algebraic equations
   1. terminology and symbols
   2. solving linear equations
   3. application of rules for parenthesis
   4. solving literal equations

b. Verbal problems
   1. key words and phrases
   2. guidelines for solving verbal problems
   3. solving verbal problems

c. Monomials and polynomials
   1. addition/subtraction
   2. multiplication/division

d. Coordinate system
   1. location of ordered pairs
   2. slope

(3) Geometry

The student will develop basic elements of geometry where formulas are provided and the application of basic concepts is important.

The student will demonstrate proficiency in each of the following areas by passing each practice exercise with at least 80% accuracy:

a. Points and lines
b. Angles
c. Triangles
d. Properties of polygons
    1. computation of perimeter
    2. computation of area
    3. general properties
e. Circles
    1. terminology
    2. computation of circumference
    3. computation of area
    4. volume
f. Similar figures and proportions
g. Congruence

MATERIALS

Steck-Vaughn GED Comprehensive Review Book
Steck-Vaughn GED Mathematics
Steck-Vaughn Mathematics Book 5
Contemporary Mathematics Series Books 1-6

All materials may not be used exclusively. Available materials will facilitate selecting alternatives which best suit the learner.

Goodhart - Wilcox Math for Welders
Nino Marim 1990

Delmar Practical Problems in Mathematics For Welders

Frank R. Schell, Bill J. Matlock 1988

ARITHMETIC

- Arithmetic Overview
    - Number Values and Facts
    - Whole Number Operations
    - Steps to Solving Word Problems
    - Steps for Solving Word Problems
    - Introduction to Fractions
    - Comparing Fractions
    - Adding and Subtracting Fractions
    - Multiplying and Dividing Fractions
    - Decimals
    - Decimal Operations
    - Decimals and Fractions
    - The Meaning of Percent
    - Solving Percent Problems (Part 1)
    - Solving Percent Problems (Part 2)

- Review: Arithmetic
    - Ratio and Proportion • Mean • Median • Probability
    - Measurement Systems
    - Perimeter, Circumference, and Area
    - Graphs, Charts, and Tables

- Review: Measurement

ALGEBRA

- Algebra Overview
    - Signed Numbers • Algebraic Expressions
    - Equations
    - Special Topics
    - Exponents and Roots

- Review: Algebra

GEOMETRY

- Geometry Overview
    - Volume
    - Angles
    - Triangles and Quadrilaterals
    - Congruence and Similarity
    - Pythagorean Relationships

- Review: Geometry

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 1

B. Topic: Number Values and Facts

C. Prerequisite: None

D. Purpose: Place Values

E. Performance Objective: The student should be able to demonstrate a basic understanding of place values and write, compare, and order numbers.

1. Activity:
   - a. The student will practice exercises 1-29 Unit 1 in values, write, compare, and order.
   - b. The student will practice exercises 1-8 Unit 1 in solving word problems.
2. Conditions: Classroom
3. Standards: 80% on practice exercises

F. ______________________________

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: I

I. Arithmetic

- A. Terms and Definitions
    - 1. Place value
    - 2. Fraction
    - 3. Decimal
    - 4. Percent
    - 5. Ratio
    - 6. Probability
    - 7. Perimeter
    - 8. Area
    - 9. Circumference
- B. Lesson 1 -- Number Values and Facts
    - 1. Place value
        - a. Ones
        - b. Tens
        - c. Hundreds, etc.
    - 2. Value of each digit by place
- C. Reading and Writing Whole Numbers
    - 1. Expressed in words
    - 2. Read from left to right
    - 3. Each group of digits is called a period
- D. Comparing Numbers
    - 1. = equals
    - 2. > greater than
    - 3. < less than
- E. Rounding
    - 1. When exact numbers not needed
    - 2. Rounding up
    - 3. Rounding down
- F. Solving Word Problems
    - 1. What are you trying to find out?
    - 2. Which function is used?
        - a. Add
        - b. Divide
        - c. Multiply
        - d. Subtract

NAME ____

1. What number has 3 in the hundreds place?

836 3214 613 5380

1. ________________

Tell what each 9 means.

2. 4893

3. 968,452,327

2. ________________

3. ________________

4. Write the digits in the thousands period.

429,283,152

4. ________________

5. Write 357 in words.

5. ________________

____

6. Write 5643 in expanded form.

6. ________________

7. Write 4 million, 792 thousand, 317

7. ________________

Compare these numbers.
Use >, <, or =.

8. 687 ○ 752

9. 3946 ○ 3957

8. ________________

9. ________________

10. **List these numbers in order from the least to the greatest.**

745 732 796

10. ________________

11. **Round 185 to the nearest hundred.**

11. ________________

12. **Round 8327 to the nearest ten.**

12. ________________

13. **Round 9473 to the nearest thousand.**

13. ________________

NAME ______________________________

Give each answer.

14. 9 + 7 **15.** 13 − 9 **16.** 8 + 6

14. ____________

15. ____________

16. ____________

Add.

17. $\begin{array}{r} 59 \\ +14 \\ \hline \end{array}$ **18.** $\begin{array}{r} 577 \\ +216 \\ \hline \end{array}$ **19.** $\begin{array}{r} 37 \\ 64 \\ +47 \\ \hline \end{array}$

20. $\begin{array}{r} 632 \\ +399 \\ \hline \end{array}$ **21.** $\begin{array}{r} 4218 \\ +2925 \\ \hline \end{array}$ **22.** $\begin{array}{r} 18{,}079 \\ +\ 7{,}632 \\ \hline \end{array}$

17. ____________

18. ____________

19. ____________

20. ____________

21. ____________

22. ____________

Estimate each sum.

23. $\begin{array}{r} 67 \\ +78 \\ \hline \end{array}$ **24.** $\begin{array}{r} 563 \\ +227 \\ \hline \end{array}$ **25.** $\begin{array}{r} 3282 \\ +6073 \\ \hline \end{array}$

23. ____________

24. ____________

25. ____________

Obj.	Test items	Acceptable score	Actual score	O.K.	Needs help
1	1–7	4 of 7	____ of 7		
2	8–10	2 of 3	____ of 3		
3	11–13	2 of 3	____ of 3		

Obj.	Test items	Acceptable score	Actual score	O.K.	Needs help
4	14–16	2 of 3	____ of 3		
5	17–22	4 of 6	____ of 6		
6	23–25	2 of 3	____ of 3		

Total ____ of 25

NAME ______________________________

SKILL DRILL

Estimate each sum by rounding to the nearest hundred dollars.

1. $429 – $400
+ 79 – +100
$500

2. $273 –
+ 129 – _____

3. $809 –
+ 333 – _____

4. $726 –
+ 133 – _____

5. $816 –
89 –
+ 359 – _____

6. $903 –
619 –
+ 306 – _____

7. $393 –
416 –
+ 909 – _____

8. $891 –
23 –
+ 89 – _____

Estimate each sum by rounding to the nearest ten dollars.

9. $319 – $320
+ 89 – + 90
$410

10. $463 –
+ 219 – _____

11. $708 –
+ 434 – _____

12. $516 –
+ 142 – _____

13. $629 –
78 –
+ 513 – _____

14. $103 –
809 –
+ 718 – _____

15. $113 –
8 –
+ 21 – _____

16. $ 4 –
17 –
+ 103 – _____

17. $415 + $389 __________

18. $381 + $411 + $95 __________

19. $741 + $583 + $915 __________

20. $32 + $585 + $472 __________

21. $828 + $93 + $513 __________

22. $19 + $609 + $759 __________

Check yourself. Here are the scrambled answers:

$120 $140 $400 $410 $500 $660 $680 $800 $810
$890 $1000 $1090 $1100 $1140 $1220 $1300 $1390 $1430
$1630 $1700 $1800 $2240

NAME ______________________________

OLYMPIC FACT

Catherine Breyton of France held a world's speed record for women skiers.

What was Catherine Breyton's speed in miles per hour?

To find the answer:

1. Write the standard numeral.
2. Cross out each box below that contains an answer.
3. Read the answer to the riddle using the letters in the remaining boxes.

1. 4 thousandths 0.004
2. 17 and 5 tenths ______
3. 24 and 3 hundredths ______
4. 7 thousandths ______
5. 57 and 51 hundredths ______
6. 278 and 69 hundredths ______
7. 578 thousandths ______
8. 35 and 256 thousandths ______
9. 8 and 69 thousandths ______
10. 4275 ten-thousandths ______
11. 4 hundredths ______
12. 17 and 5 thousandths ______
13. 24 and 3 tenths ______
14. 7 hundredths ______
15. 57 and 51 thousandths ______
16. 278 and 69 thousandths ______
17. 578 ten-thousandths ______
18. 35 and 256 ten-thousandths ______
19. 8 and 69 hundredths ______
20. 4 and 275 thousandths ______

F 0.4275	O 17.05	U 57.51	T 8.69	N 27.869	R 0.007	E 5.7051
E 0.07	~~I~~ ~~0.004~~	H 5.78	G 8.069	U 80.69	H 4.275	T 17.005
N 14.275	S 24.3	D 0.4	I 35.0256	R 2.43	X 278.069	E 42.75
T 35.256	D 86.9	E 57.051	T 0.7	N 17.5	H 0.243	S 0.578
R 427.5	T 24.03	E 8.0069	W 278.69	O 0.04	E 1.75	U 0.0578

Answer: ______________________________ miles per hour

NAME ______________________

SCRAMBLED MATH

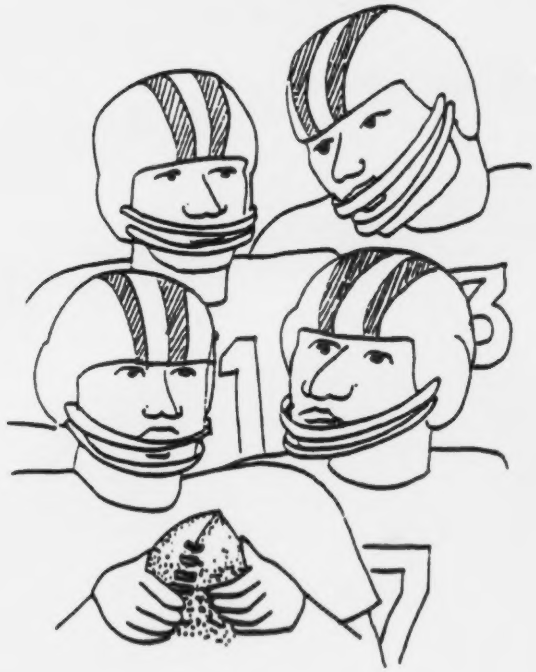
Unscramble the letters to get the answer.

ETN plus HIEGT plus REHTE equals ________.

WHO IS IT?

Bubba scored more points than O'Brien. O'Brien scored fewer points than Gus. Tony scored more points than Bubba, but fewer points than Gus.

Who scored the most points? ____________



NUMBER IT!

How many times would you use the digit 9 to number the pages of a 100-page book? *Hint: The answer is more than 18.*

OFF AND ON

You switched off a light. Then you switched it 15 more times. Then you switched it 13 more times. Was the light on or off when you stopped?

LOOSE CHANGE

There is 55¢ in the purse. What 4 coins are in the purse?

____

____

____

____

BOWLING SCORES

Name	FIRST GAME	SECOND GAME	THIRD GAME
Rick	118	101	158
Carrie	159	112	137
Jody	97	121	89
Eric	167	116	127

Which bowler had the lowest total score for all three games?

Which two bowlers had about the same total score for all three games?

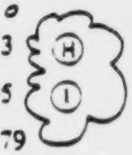
NAME ______________________________________

Here is the answer; do you know the question?
739.666 MPH

To find the question:

1. Round each number in the *exercise* column; then find the answer in the *answer* column.
2. Each exercise has a number and each answer has a letter. Match the numbers and letters in the question bubble at the bottom of the page.

EXERCISES	ANSWERS
① 19.327 to the nearest hundredth = 19.33	Ⓛ 3.5
② 3.51 to the nearest tenth = ____________	Ⓥ $2.00
③ 16.9 to the nearest whole number = ____________	Ⓒ 3.6
④ $2.89 to the nearest dollar = ____________	Ⓡ 0.1
⑤ 28.928 to the nearest whole number = ____________	Ⓔ 29.93
⑥ 3.59 to the nearest tenth = ____________	Ⓗ 19.3
⑦ 29.928 to the nearest hundredth = ____________	Ⓞ 1
⑧ $2.02 to the nearest dollar = ____________	Ⓣ $180.00
⑨ 16.0125 to the nearest whole number = ____________	Ⓐ 407.0
⑩ 0.056 to the nearest tenth = ____________	Ⓦ $200.00
⑪ 16.949 to the nearest hundredth = ____________	Ⓘ 17
⑫ $179.79 to the nearest dollar = ____________	Ⓣ $3.00
⑬ 79.912 to the nearest whole number = ____________	Ⓐ 79.9
⑭ 19.299 to the nearest tenth = ____________	Ⓢ $100.00
⑮ 234.789 to the nearest hundredth = ____________	Ⓖ 16
⑯ $99.89 to the nearest dollar = ____________	Ⓗ 19.33
⑰ 0.86 to the nearest whole number = ____________	Ⓟ 16.95
⑱ 406.98 to the nearest tenth = ____________	Ⓝ 234.79
⑲ 79.912 to the nearest tenth = ____________	Ⓔ 80
⑳ $199.76 to the nearest dollar = ____________	Ⓓ 29



○ Ⓗ ○ ○   ○ ○   ○ ○ ○   Ⓗ ○ ○ Ⓗ ○ ○ ○   ○ ○ ○ ○ ○
⑳ ① ⑱ ④   ③ ⑯   ⑫ ⑭ ⑦   ① ③ ⑨ ① ⑬ ⑯ ④   ⑯ ⑪ ⑦ ⑬ ⑤

○ ○ ○ ○   ○ ○ Ⓗ ○ ○ ○ ○ ○   ○ ○   ○ ○ ○ ○ ?
⑦ ⑧ ⑬ ⑩   ⑱ ⑥ ① ③ ⑦ ⑧ ⑬ ⑤   ⑰ ⑮   ② ⑲ ⑮ ⑤

Unit 1

INTRODUCTION TO WHOLE NUMBERS

INTRODUCTION

A mastery of mathematics is one of the skills expected of you as a welder. Fortunately, the method of acquiring math skills is no different than any other skill. You learn the principles and then practice them in repeated applications until they become "second nature."

What about the questions: "Do I need to know math if I know how to use an electronic calculator?" "Is it necessary to develop a skill in mental calculation and a mastery of math facts?" There are some practical reasons why the answer to these questions is YES. First, your employer, supervisor, etc., will expect you to be knowledgeable in math. They will assume that, as a tradesperson, basic math skills and facts will be part of the mental skills you bring to the job. If you begin your training in math by relying on a calculator, you will do yourself a great disservice. A calculator will not give you the confidence and understanding that comes with building a skill.

Also, when a group of welders are discussing the math aspects of a job (dimensions, weights, volumes, costs, etc.) you must be able to "keep up" with the discussion. If your math skills are weak, you will likely feel very uncomfortable about joining in on this part of your work. Besides, there is certain admiration granted to a tradesperson by fellow workers who recognize that the person is clearly proficient in math.

MATH WORK HABITS

Although math is almost entirely a mental activity, there is a small but important tangible component to it. All your calculations, dimensions, and notes, must be readable. Correct results are, of course, the "final product" of math but the calculations should be done with a high degree of neatness and care. Orderly work in math is one of the important factors in arriving at correct answers. Listed are some suggestions you might find useful.

1. Write your numbers fairly large.
2. A poorly written 4 and 9 are easily confused.
3. Try writing 7 as 7. The number 7, when handwritten, can sometimes be confused with 1 or 2. The slash helps to avoid this confusion.
4. Always carry a thick, sharp pencil while in the shop or in the field.
5. When dealing with numbers, don't rush. In fact, deliberately slow yourself down. If you consider the amount of time it takes to turn out a job in the shop, there is no measurable gain in time by calculating and writing figures quickly.

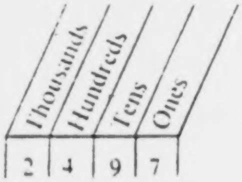
OUR NUMBER SYSTEM

Our number system is based on ten digits, namely, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. Because the Arabs originated the system, it is sometimes called the **Arabic number system.** Also, since it consists of ten digits, it is often referred to as the **Decimal number system.** Decimal is a word derived from Latin meaning "ten."

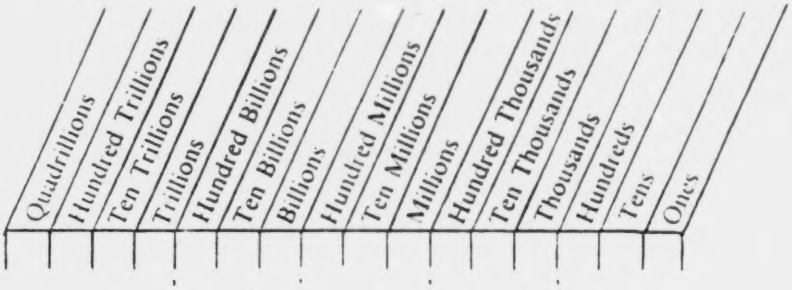
Practically any number can be expressed by arranging these numbers in a certain order. When a series of digits is written, such as 2497, each of the numbers in that group take on a certain value based on its **place value** in the lineup. In the example 2497, the 7 is considered a 7 because it is in the ones (or units) position. The 9 has a value of 90 because it is in the tens position. You can think of it as 9 × 10 = 90. The 4, because of its place in the lineup, has a value of

BEST COPY AVAILABLE

400. It is in the hundreds column, so you can think of it as 4 × 100 = 400. The 2 is placed in the thousands position and has a value of 2000.



Each of the positions in a line of figures has a value and a name. Listed below are some of the names and their place position.



To help make numbers easier to read, a comma is usually placed after every third digit counting from the right. Here is an example. The number 3,894,076,215 is divided by commas and is read as three billion, eight hundred ninety four million, seventy six thousand, two hundred fifteen. The 3 has a place value of three billion. The 8 has a place value of eight hundred million, the 9 has a place value of ninety million and so on.

ROUNDING NUMBERS

There are some occasions in math where extreme accuracy is not required. Cost estimates for most jobs are not usually exact. Precise weights of large weldments are often not necessary. In these and many other situations, figures may be **rounded**. Since rounded figures are not perfectly accurate, they are called **approximate numbers.**

HOW TO ROUND NUMBERS

Here is method for rounding numbers:

1. First, find out to what place value you are rounding. Normally, you are asked to "round to the nearest hundred or thousand," etc.
2. Place a little tick mark over the digit in that place position.
3. If the figure to the right of that number is 5 or more, increase the ticked number by one.
4. If the figure to the right is less than five, do not change the ticked number.
   For example: Round 17,289,364 to the nearest ten thousand. Place a tick mark at the ten thousand position (17,2$\check{8}$9,364). Since the digit to the right is "5 or more," the 8 is changed to 9. The rounded answer is 17,290,000.

DENOMINATE NUMBERS

Despite its long name, denominate numbers are simple. They are just numbers that represent measurements. For example, 4 feet is a denominate number. The number 4, by itself, is not a denominate number. As soon as you add a description to a number showing that it represents some kind of measurement, then it is classified a **denominate number.** More examples are, 6 gallons, 5 3/16 in., 186 pounds, 1,800°F, and 55 miles per hour.

As you may have guessed, welders work almost entirely with denominate numbers. It is im-

BEST COPY AVAILABLE

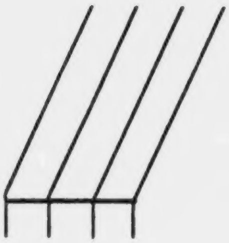
portant to remember that when a question is expressed in denominate numbers, your answer must also be a denominate number.

KEY TERMS FOR WELDERS

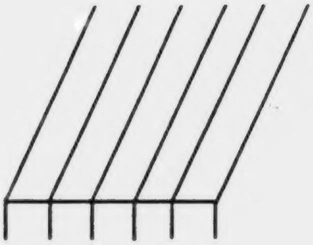
ARABIC NUMBER SYSTEM
DECIMAL NUMBER SYSTEM
PLACE VALUE
ROUNDING
APPROXIMATE NUMBERS
DENOMINATE NUMBERS

Unit 1—Practicing Using Whole Numbers

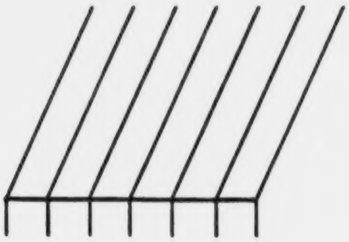
1. What are the place values of each figure in the following numbers?



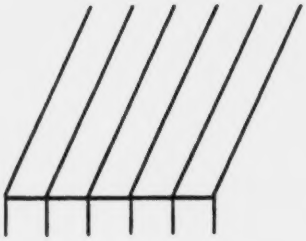
(a) 471



(b) 15,286



(c) 349,015



(d) 27,636

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 2

B. Topic: Whole Number Operations

C. Prerequisite: Number Values and Facts

D. Purpose: To do Four Basic Operations Accurately

E. Performance Objective: The student should be able to demonstrate accurate computations in addition, subtraction, division and multiplication.

1. Activity:
    - a. Student will practice exercises 1-36 Unit 2.
    - b. Student will practice exercises 1-8 Unit 2 in solving word problems.
2. Conditions: Classroom
3. Standards: 80% on practice exercises

F. ________________________________
(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: II

I. Whole Number Operations

- A. Addition
    1. To combine quantities
    2. To find a total
    3. Align place values
    4. Work right to left
- B. Subtraction
    1. Find differences between numbers
    2. Lower number below higher number
    3. Work to left
    4. Borrow
- C. Multiplication
    1. Add some number repeatedly
    2. Work from right
    3. Line results under digits
    4. Add results of each multiplication
- D. Division
    1. How many times one number goes into another
    2. Remainders
- E. Solving Word Problems
    1. Read
    2. Plan
    3. Solve
    4. Check

NAME ______________________________

SKILL DRILL

Study these examples.

75	408	3274
× 39	× 26	× 47
675	2448	57918
225	816	33096
2925	10,608	388,878

Multiply.

1. 68 × 32
2. 75 × 25
3. 67 × 23
4. 36 × 84
5. 94 × 65
6. 641 × 83
7. 525 × 37
8. 484 × 18
9. 657 × 61
10. 768 × 46
11. 592 × 53
12. 724 × 26
13. 965 × 48
14. 368 × 54
15. 709 × 28
16. 2358 × 14
17. 1674 × 28
18. 5230 × 45
19. 2406 × 49
20. 6002 × 27

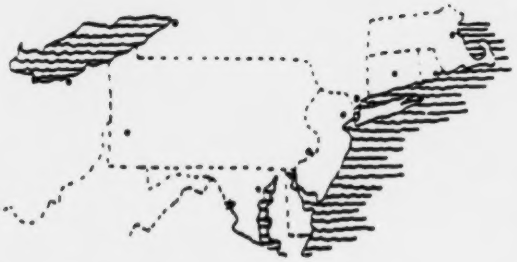
Check yourself. Here are the scrambled answers:

1541 1875 2176 3024 6110 8712 18,824 19,425 19,852 19,872
31,376 33,012 35,328 40,077 46,320 46,872 53,203 117,894
162,054 235,350

NAME ______________________________

WHICH CITIES?

The first telegram was sent on May 24, 1844. Between which two cities was the message sent?



To find the answer:

1. Multiply.
2. Write the letter under its matching number in the DECODER.

1. 472 × 218 3776 472 944 102,896 **W**	2. 221 × 323 **L**	3. 247 × 273 **I**	4. 438 × 324 **A**	5. 695 × 118 **T**
6. 534 × 176 **N**	7. 625 × 135 **S**	8. 182 × 245 **B**	9. 421 × 603 **G**	10. 303 × 201 **H**
11. 473 × 220 **D**	12. 571 × 630 **E**	13. 742 × 234 **M**	14. 121 × 143 **O**	15. 291 × 268 **R**

DECODER

102,896	141,912	84,375	60,903	67,431	93,984	253,863	82,010	17,303	93,984
W									

141,912	93,984	104,060

44,590	141,912	71,383	82,010	67,431	173,628	17,303	77,988	359,730

NAME ______________________________

SKILL DRILL

Study these examples.

$$\begin{array}{r} 75 \\ \times 39 \\ \hline 675 \\ 225 \\ \hline 2925 \end{array} \qquad \begin{array}{r} 408 \\ \times\ 26 \\ \hline 2448 \\ 816 \\ \hline 10,608 \end{array} \qquad \begin{array}{r} 8274 \\ \times\ 47 \\ \hline 57918 \\ 33096 \\ \hline 388,878 \end{array}$$

Multiply.

1. 68 × 32
2. 75 × 25
3. 67 × 23
4. 36 × 84
5. 94 × 65
6. 641 × 83
7. 525 × 37
8. 484 × 18
9. 657 × 61
10. 768 × 46
11. 592 × 53
12. 724 × 26
13. 965 × 48
14. 368 × 54
15. 709 × 28
16. 2358 × 14
17. 1674 × 28
18. 5230 × 45
19. 2406 × 49
20. 6002 × 27

Check yourself. Here are the scrambled answers:

1541 1875 2176 3024 6110 8712 18,824 19,425 19,852 19,872
31,376 33,012 35,328 40,077 46,320 46,872 53,203 117,894
162,054 235,350

NAME ______________________________

WHAT IS IT?

What gets less tired the farther it goes?

To find the answer:

1. Multiply.
2. Cross out each box below that contains an answer.
3. Read the answer using the letters in the remaining boxes.

1. 86 × 9
774

2. 68 × 7

3. 91 × 8

4. 78 × 4

5. 95 × 6

6. 387 × 5

7. 196 × 7

8. 405 × 8

9. 372 × 4

10. 276 × 9

11. 2148 × 3

12. 6125 × 2

13. 1253 × 4

14. 5472 × 8

15. 1233 × 5

16. 6007 × 5

17. 3874 × 9

18. 7158 × 4

19. 3697 × 6

20. 4259 × 7

N 1935	A 4025	T 6444	S 476	N 317	O 28,632	R 43,776	~~C~~ ~~774~~	A 3240	S 12,250
A 8075	S 34,866	U 7012	B 312	S 2484	A 1372	T 926	D 29,813	O 11,216	F 728
I 5012	T 5550	O 1488	R 30,035	I 419	S 570	R 27,717	M 22,182	E 913	S 6165

Answer: ______________________________

NAME ____________________

A BILLION DOLLARS

How high would a stack of a billion $1 bills be?

THE UNITED STATES OF AMERICA
ONE DOLLAR

Multiply. Then use the DECODER to get the answer.

DECODER

24,000	40,000	2400	1200	6000	10,000	16,000	800	45,000	12,000
I	B	S	K	E	A	M	C	D	N
1600	1500	4000	4800	8000	4500	28,000	2800	120,000	600
G	V	O	T	H	F	W	L	U	Y

1. 200 × 50 = 10,000 | A

2. 30 × 80 = ______ | ___
3. 800 × 6 = ______ | ___
4. 1000 × 10 = ______ | ___
5. 400 × 2 = ______ | ___
6. 60 × 20 = ______ | ___

7. 200 × 20 = ______ | ___
8. 90 × 50 = ______ | ___

9. 2400 × 2 = ______ | ___
10. 80 × 100 = ______ | ___
11. 30 × 200 = ______ | ___
12. 400 × 40 = ______ | ___

13. 700 × 40 = ______ | ___
14. 50 × 80 = ______ | ___
15. 300 × 400 = ______ | ___
16. 14 × 200 = ______ | ___
17. 5000 × 9 = ______ | ___

18. 200 × 200 = ______ | ___
19. 20 × 300 = ______ | ___

20. 60 × 40 = ______ | ___
21. 60 × 100 = ______ | ___
22. 30 × 50 = ______ | ___
23. 10 × 600 = ______ | ___
24. 600 × 20 = ______ | ___
25. 60 × 80 = ______ | ___
26. 20 × 30 = ______ | ___

27. 80 × 200 = ______ | ___
28. 400 × 60 = ______ | ___
29. 70 × 40 = ______ | ___
30. 200 × 30 = ______ | ___
31. 24 × 100 = ______ | ___

32. 40 × 200 = ______ | ___
33. 30 × 800 = ______ | ___
34. 40 × 40 = ______ | ___
35. 80 × 100 = ______ | ___

*Multiplying by multiples of
10, 100, and 1000*

NAME ______________________________

SKILL DRILL

Study these examples.

$$\begin{array}{r} 109 \\ 5\overline{)545} \\ -5 \\ \hline 45 \\ -45 \\ \hline 0 \end{array} \qquad \begin{array}{r} 320 \\ 7\overline{)2240} \\ -21 \\ \hline 14 \\ -14 \\ \hline 0 \end{array} \qquad \begin{array}{r} 49 \\ 9\overline{)441} \\ -36 \\ \hline 81 \\ -81 \\ \hline 0 \end{array}$$

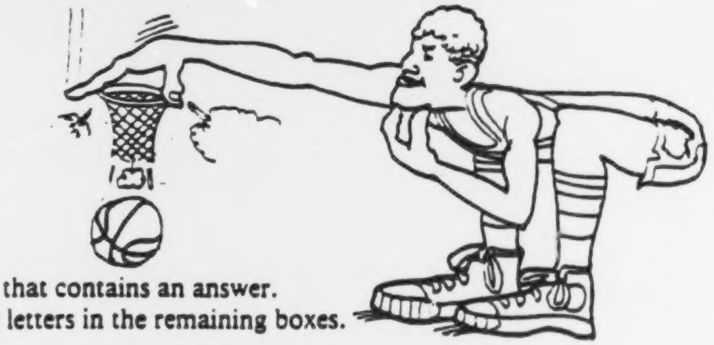
Divide.

1. $6\overline{)2412}$
2. $8\overline{)2960}$
3. $5\overline{)3675}$
4. $9\overline{)5580}$
5. $7\overline{)3549}$
6. $4\overline{)1236}$
7. $3\overline{)6201}$
8. $5\overline{)3900}$
9. $8\overline{)5320}$
10. $6\overline{)2454}$
11. $2\overline{)4616}$
12. $9\overline{)5040}$
13. $7\overline{)4221}$
14. $5\overline{)5015}$
15. $4\overline{)3636}$
16. $8\overline{)8064}$
17. $6\overline{)6270}$
18. $5\overline{)4175}$
19. $9\overline{)3150}$
20. $7\overline{)1050}$

Check yourself. Here are the scrambled answers:

150 309 350 370 402 409 507 560 603 620 665 735
780 835 909 1003 1008 1045 2067 2308

NAME ______________________________



HOW TALL?

How tall was the world's tallest human being?

To find the answer:

1. Divide.
2. Cross out each box below that contains an answer.
3. Read the answer using the letters in the remaining boxes.

1. 67)1407
2. 35)1194
3. 52)1404
4. 51)6814
5. 31)789
6. 19)816
7. 81)4536
8. 24)842
9. 68)2584
10. 77)2464
11. 72)5394
12. 51)18,342
13. 72)2088
14. 35)11,138
15. 41)3157

S 318 R8	E 15	E 38	I 9 R6	X 42 R18	G 112 R2	A 34 R4	H 49	T 53 R2
Y 77	F 40 R16	A 27	R 21	E 72	D 359 R33	E 28 R1	S 35 R2	T 320 R14
E 76 R5	N 56	L 26 R3	I 29	E 11 R8	V 42 R2	N 25 R14	E 76	N 19 R2
I 4 R31	F 74 R66	N 38 R4	C 55	E 133 R31	H 86	T 32	E 92 R1	S 402 R10

Answer: ______________________________

NAME ______________________________

Find 3571 ÷ 58.

5
58)3571
-290
67

58 is close to 60.
Divide 6 into 35.

61 R33
58)3571
-348↓
91
-58
33

5 is too small.
Try 6.

What was the "one great sight" Theodore Roosevelt said every American should see?

To find out, divide. Each time an answer is given below, write the letter for that exercise. Two answers are used twice.

1. 32)597 **D**
18 R21
-32
277
-256
21

2. 26)618 **C**

3. 43)734 **A**

4. 29)1846 **Y**

5. 53)3928 **N**

6. 47)2135 **G**

7. 62)3509 **O**

8. 55)4998 **R**

9. 37)1012 **N**

____	____	____	____	D	____	____	____	____	____	____
45 R20	90 R48	17 R3	27 R13	18 R21	23 R20	17 R3	74 R6	63 R19	56 R37	27 R13

NAME

Divide.

1. 5)63

12R3

-5↓

13

-10

3

2. 6)89

3. 7)93

4. 4)5317

1329R1

-4↓

13

-12↓

11

-8↓

37

-36

1

5. 7)759

6. 5)324

7. 4)739

8. 6)537

9. 9)8632

10. 8)4317

11. 5)1748

12. 2)9325

NAME

Multiply.

1. 1572
× 234
☐☐☐☐
☐☐☐☐0
☐☐☐☐00
☐☐☐☐☐☐

2. 586
× 200
☐☐☐☐☐☐

3. 132
× 474
☐☐☐
☐☐☐0
☐☐☐00
☐☐☐☐☐

4. 803
× 461
☐☐☐
☐☐☐☐☐
☐☐☐☐☐☐
☐☐☐☐☐☐

What kind of shoes should vacationers wear?

Multiply. Each time an answer is given below, write the letter for that exercise. Some answers are not used.

5. 762
×213
2286
7620
152400
162,306
A

6. 326
×215
T

7. 184
×257
B

8. 251
×133
J

9. 482
×506
E

10. 732
×109
S

11. 1534
× 126
O

12. 2903
× 246
L

13. 157
×400
M

14. 389
×300
R

15. 835
×600
F

16. 762
×200
K

		A				
714,138	193,284	162,306	501,000	243,892	116,700	79,788

NAME ______________________________

Multiply.

1. 58 × 18 ☐☐☐ 580 ☐☐☐☐	2. 256 × 37 1792 ☐☐☐0 ☐☐☐☐	3. 481 × 29 ☐☐☐☐ ☐☐☐☐ ☐☐☐☐☐	4. 1703 × 41 ☐☐☐☐ ☐☐☐☐☐ ☐☐☐☐☐
5. 25 × 12	6. 37 × 15	7. 56 × 24	8. 46 × 42
9. 149 × 32	10. 217 × 45	11. 531 × 13	12. 323 × 19
13. 452 × 16	14. 927 × 21	15. 433 × 54	16. 280 × 37
17. 394 × 25	18. 632 × 48	19. 705 × 32	20. 841 × 54
21. 2156 × 27	22. 3032 × 56	23. 5283 × 18	24. 6705 × 43

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 3

B. Topic: Word Problems

C. Prerequisite: Whole Numbers

D. Purpose: Steps to Solving Word Problems

E. Performance Objective: The student should be able to develop analysis skills to solve word problems.

1. Activity: a. The student will practice exercises 1-28 Unit 3.

2. Conditions: Classroom

3. Standards: 80% on practice exercises

F. ______________________________

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: III

I. Steps To Solving Word Problems

- A. Estimation
  - 1. Approximate solution
  - 2. Exact solution not required
- B. Identifying Necessary Information
  - 1. Information not available
  - 2. Information not necessary
  - 3. Analyze situation

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 4

B. Topic: Solving Word Problems

C. Prerequisite: Word Problems

D. Purpose: Organizational Skill

E. Performance Objective: Student should be able to develop organizational skills in solving word problems.

1. Activity:
   a. Students will complete exercises 1-24 Unit 4.
   b. Students will complete WPL mini-test.
   c. Students will complete word problems for extra practice 1-4.

2. Conditions: Classroom

3. Standards: 80% on practice exercises

F. ________________________________
(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: IV

I. Steps For Solving Work Problems

- A. Multi-Step Problems
  - 1. More than one calculation
  - 2. Identify each step
    - a. Multiply
    - b. Divide
    - c. Subtract
    - d. Add
- B. Organizing Information
  - 1. What information is needed
  - 2. Tables and Charts

LESSON PLAN

A. Course Title: WLP Math B. Plan Number: 5

B. Topic: Fractions

C. Prerequisite: Solving Word Problems

D. Purpose: Introduction

E. Performance Objective: Student should be able to understand basic facts about fractions.

1. Activity: a. The student will practice exercises 1-8 Unit 5.

2. Conditions: Classroom

3. Standards: 80% on practice exercises

F. ____

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: V

I. Introduction To Fractions

- A. Facts about Fractions
  - 1. Numerator
  - 2. Denominator
  - 3. Terms of fraction
- B. Proper Fraction
  - 1. Quantity less than one
  - 2. Numerator is less than the denominator
- C. Improper Fraction
  - 1. Equal to or greater than one
  - 2. Numerator is equal to or greater than the denominator
- D. Mixed Numbers
  - 1. Greater than one
  - 2. Whole number and proper fraction
- E. Changing Improper Fractions and Mixed Numbers
  - 1. Improper fraction
    - a. Mixed number
    - b. Whole number
  - 2. Mixed Numbers
    - a. Improper fraction
    - b. The whole number is added to the fraction part of the mixed number
- F. Strategies for Solving Word Problems
  - 1. Same operations as whole numbers
    - a. Add
    - b. Subtract
    - c. Multiply
    - d. Divide

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 6

B. Topic: Comparing Fractions

C. Prerequisite: Introduction to Fr

D. Purpose: Determine Value

E. Performance Objective: The ply methods to determine
the

Jo

1. Activity:
   a. The student will practice exercises 1-38 Unit 6.
   b. The student will practice exercises 1-6 Unit 6.

2. Conditions: Classroom

3. Standards: 80% on practice exercises

F. ______________________________
(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: VI

I. Comparing Fractions

- A. Equal Fractions
  - 1. Different fractions same value
  - 2. Cross multiply
- B. Reducing Fractions
  - 1. Smaller number and denominator
  - 2. Lowest terms
- C. Building Equal Fractions
  - 1. Build or raise by multiplying numerator and denominator the same number
  - 2. Find an equal fraction with a given denominator
- D. Comparing Fractions
  - 1. Common denominator
  - 2. Unlike fractions
  - 3. Like fractions
  - 4. Least common denominator
- E. Solving Word Problems
  - 1. Estimating
  - 2. If the fraction is less than 1/2, the whole number stays the same
  - 3. If the fraction is 1/2 or greater, add one to the whole number

NAME ____________________

Write an improper fraction for each mixed number or whole number.

1. $\overset{+}{\underset{\times}{3\frac{1}{4}}} = \frac{\boxed{13}}{4}$

First, 4 × 3 = 12
Then 12 + 1 = 13

2. $\overset{+}{\underset{\times}{3\frac{2}{5}}} = \frac{\boxed{17}}{5}$

3. $5 = \frac{\square}{2}$

4. $7 = \frac{\square}{4}$

5. $2\frac{3}{8} = \frac{\square}{8}$

6. $4\frac{2}{3} = \frac{\square}{3}$

7. $1\frac{1}{4} = \frac{\square}{4}$

8. $5\frac{1}{6} = \frac{\square}{6}$

9. $7\frac{2}{3} = \frac{\square}{3}$

10. $6\frac{1}{4} = \frac{\square}{4}$

11. $2\frac{5}{6} = \frac{\square}{6}$

What do you find in a marching band and a flock of turkeys?

Write an improper fraction for each mixed number. Then find your answer below. Write the letter for that answer. One answer is used twice.

12. $2\frac{5}{8}$ ____ U

13. $1\frac{7}{9}$ ____ C

14. $3\frac{2}{3}$ ____ T

15. $6\frac{5}{6}$ ____ M

16. $4\frac{2}{5}$ ____ K

17. $2\frac{3}{4}$ ____ D

18. $1\frac{8}{9}$ ____ S

19. $5\frac{1}{10}$ ____ I

20. $5\frac{4}{7}$ ____ R

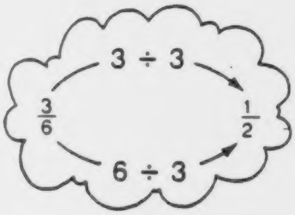
____ ____ ____ ____ ____ ____ ____ ____ ____ ____

$\frac{11}{4}$ $\frac{39}{7}$ $\frac{21}{8}$ $\frac{41}{6}$ $\frac{17}{9}$ $\frac{11}{3}$ $\frac{51}{10}$ $\frac{16}{9}$ $\frac{22}{5}$ $\frac{17}{9}$

NAME ______________________________

Tell if each fraction is in lowest terms.
Write *yes* or *no*.

1. $\frac{3}{6}$ no



2. $\frac{1}{3}$ ________

3. $\frac{2}{5}$ ________

4. $\frac{2}{6}$ ________

5. $\frac{4}{9}$ ________

6. $\frac{4}{13}$ ________

7. $\frac{6}{15}$ ________

8. $\frac{4}{12}$ ________

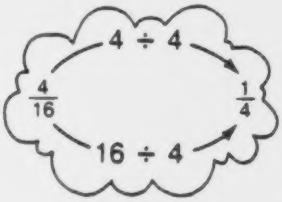
9. $\frac{7}{14}$ ________

10. $\frac{3}{7}$ ________

11. $\frac{3}{9}$ ________

Write each fraction in lowest terms.

12. $\frac{4}{16}$ $\frac{1}{4}$



13. $\frac{5}{20}$ ________

14. $\frac{6}{9}$ ________

15. $\frac{2}{12}$ ________

16. $\frac{10}{25}$ ________

17. $\frac{12}{36}$ ________

18. $\frac{18}{24}$ ________

19. $\frac{16}{20}$ ________

20. $\frac{8}{14}$ ________

21. $\frac{11}{22}$ ________

22. $\frac{14}{28}$ ________

23. $\frac{9}{27}$ ________

24. $\frac{18}{26}$ ________

25. $\frac{7}{21}$ ________

26. $\frac{10}{14}$ ________

NAME ______________________________

Rename each fraction or mixed number.

1. $\frac{5}{3}$ $1\frac{2}{3}$

$$\begin{array}{r} 1\frac{2}{3} \\ 3\overline{)5} \\ -3 \\ \hline 2 \end{array}$$

2. $1\frac{9}{4}$ $3\frac{1}{4}$

$1 + 2\frac{1}{4} = 3\frac{1}{4}$

$$\begin{array}{r} 2\frac{1}{4} \\ 4\overline{)9} \\ -8 \\ \hline 1 \end{array}$$

3. $\frac{10}{3}$ ______

4. $2\frac{3}{3}$ ______

5. $\frac{8}{5}$ ______

6. $6\frac{9}{7}$ ______

7. $\frac{12}{10}$ ______

8. $5\frac{15}{5}$ ______

9. $\frac{9}{9}$ ______

10. $\frac{13}{8}$ ______

11. $2\frac{4}{3}$ ______

12. $\frac{15}{7}$ ______

13. $4\frac{16}{4}$ ______

14. $\frac{19}{6}$ ______

What is the lowest place on earth?

Add. Then find your answer below. Write the letter for that number. Two answers are used twice.

15. $2\frac{4}{7} + 3\frac{5}{7}$ = $5\frac{9}{7}$ **D**

$= 6\frac{2}{7}$

16. $3\frac{2}{5} + 1\frac{3}{5}$ **H**

17. $\frac{5}{8} + \frac{6}{8}$ **E**

18. $4\frac{1}{3} + 5\frac{2}{3}$ **T**

19. $3\frac{4}{9} + 4\frac{8}{9}$ **S**

20. $\frac{9}{10} + \frac{8}{10}$ **E**

21. $6\frac{3}{4} + 7\frac{2}{4}$ **E**

22. $8\frac{5}{6} + 3\frac{3}{6}$ **A**

			D			D				
10	5	$1\frac{7}{10}$	$6\frac{2}{7}$	$1\frac{3}{8}$	$12\frac{1}{3}$	$6\frac{2}{7}$		$8\frac{1}{3}$	$14\frac{1}{4}$	$12\frac{1}{3}$

NAME ____________________

Add.

1. $\begin{array}{r} 1\frac{3}{4} = 1\frac{6}{8} \\ + 2\frac{1}{8} = + 2\frac{1}{8} \\ \hline 3\frac{7}{8} \end{array}$

Write the fractions with a common denominator. Add.

2. $\begin{array}{r} \frac{1}{3} \\ + \frac{1}{2} \\ \hline \end{array}$

3. $\begin{array}{r} \frac{2}{5} \\ + \frac{1}{3} \\ \hline \end{array}$

4. $\begin{array}{r} 2\frac{2}{3} \\ + 2\frac{1}{4} \\ \hline \end{array}$

5. $\begin{array}{r} 4\frac{1}{6} \\ + 3\frac{1}{2} \\ \hline \end{array}$

6. $\begin{array}{r} \frac{3}{8} \\ + \frac{1}{2} \\ \hline \end{array}$

7. $\begin{array}{r} \frac{4}{9} \\ + \frac{1}{3} \\ \hline \end{array}$

8. $\begin{array}{r} \frac{1}{3} = \frac{4}{12} \\ + \frac{3}{4} = + \frac{9}{12} \\ \hline \frac{13}{12} = 1\frac{1}{12} \end{array}$

A common denominator is 12.

9. $\begin{array}{r} 1\frac{3}{4} \\ + 2\frac{1}{2} \\ \hline \end{array}$

10. $\begin{array}{r} 3\frac{1}{3} \\ + 8\frac{4}{5} \\ \hline \end{array}$

11. $\begin{array}{r} 7\frac{2}{3} \\ + 1\frac{2}{9} \\ \hline \end{array}$

12. $\begin{array}{r} 4\frac{1}{5} \\ + 5\frac{2}{3} \\ \hline \end{array}$

13. $\begin{array}{r} 9\frac{1}{4} \\ + 2\frac{1}{2} \\ \hline \end{array}$

14. $\begin{array}{r} 6\frac{1}{8} \\ + 3\frac{1}{4} \\ \hline \end{array}$

15. $\begin{array}{r} 1\frac{3}{10} \\ + 8\frac{1}{5} \\ \hline \end{array}$

16. $\begin{array}{r} 2\frac{1}{4} \\ + 4\frac{1}{3} \\ \hline \end{array}$

17. $\begin{array}{r} 5\frac{5}{8} \\ + 6\frac{1}{4} \\ \hline \end{array}$

18. $\begin{array}{r} 5\frac{1}{6} \\ + 3\frac{1}{2} \\ \hline \end{array}$

19. $\begin{array}{r} 5\frac{7}{10} \\ + 3\frac{1}{5} \\ \hline \end{array}$

20. $\begin{array}{r} 7\frac{2}{3} \\ + 6\frac{1}{9} \\ \hline \end{array}$

21. $\begin{array}{r} 4\frac{3}{4} \\ + 2\frac{2}{3} \\ \hline \end{array}$

22. $\begin{array}{r} 2\frac{1}{5} \\ + 3\frac{1}{2} \\ \hline \end{array}$

NAME ______________________________

Subtract. In the boxes below, cross out the letter below each answer. The remaining letters will give you a math message.

1. $\begin{array}{r} 8\frac{1}{3} \\ -5\frac{3}{4} \\ \hline \end{array} = \begin{array}{r} 8\frac{4}{12} \\ -5\frac{9}{12} \\ \hline \end{array} = \begin{array}{r} 7\frac{16}{12} \\ -5\frac{9}{12} \\ \hline 2\frac{7}{12} \end{array}$

Borrow 1, or $\frac{12}{12}$, from 8

2. $\begin{array}{r} 3 \\ -1\frac{3}{5} \\ \hline \end{array}$

3. $\begin{array}{r} 8\frac{1}{2} \\ -2\frac{7}{8} \\ \hline \end{array}$

4. $\begin{array}{r} 7 \\ -3\frac{1}{3} \\ \hline \end{array}$

5. $\begin{array}{r} 9\frac{4}{15} \\ -4\frac{2}{3} \\ \hline \end{array}$

6. $\begin{array}{r} 25 \\ -6\frac{1}{7} \\ \hline \end{array}$

7. $\begin{array}{r} 3\frac{5}{6} \\ -1\frac{6}{7} \\ \hline \end{array}$

8. $\begin{array}{r} 5\frac{1}{9} \\ -4\frac{2}{3} \\ \hline \end{array}$

9. $\begin{array}{r} 10\frac{1}{4} \\ -5\frac{2}{5} \\ \hline \end{array}$

10. $\begin{array}{r} 13\frac{1}{3} \\ -13\frac{1}{6} \\ \hline \end{array}$

11. $\begin{array}{r} 9\frac{5}{8} \\ -6\frac{5}{6} \\ \hline \end{array}$

12. $\begin{array}{r} 10 \\ -3\frac{7}{9} \\ \hline \end{array}$

13. $\begin{array}{r} 4\frac{3}{7} \\ -2\frac{9}{14} \\ \hline \end{array}$

14. $\begin{array}{r} 12 \\ -10\frac{5}{8} \\ \hline \end{array}$

15. $\begin{array}{r} 12\frac{1}{6} \\ -2\frac{3}{4} \\ \hline \end{array}$

16. $\begin{array}{r} 16 \\ -9\frac{3}{8} \\ \hline \end{array}$

17. $\begin{array}{r} 30\frac{4}{9} \\ -16\frac{7}{12} \\ \hline \end{array}$

18. $\begin{array}{r} 9\frac{1}{5} \\ -6\frac{1}{6} \\ \hline \end{array}$

$18\frac{6}{7}$	$5\frac{5}{8}$	$4\frac{13}{20}$	$\frac{4}{9}$	$6\frac{5}{8}$	$\frac{7}{9}$	$1\frac{37}{42}$	$1\frac{11}{14}$	$6\frac{7}{8}$	$6\frac{2}{9}$	5	$13\frac{35}{36}$	$3\frac{1}{3}$	$\frac{1}{6}$	$\cancel{2\frac{7}{12}}$
B	P	A	M	O	L	L	E	M	I	A	T	H	J	A

$1\frac{3}{8}$	$1\frac{41}{42}$	$6\frac{1}{9}$	$3\frac{2}{3}$	10	$13\frac{31}{36}$	$9\frac{5}{12}$	$4\frac{4}{5}$	$4\frac{17}{20}$	$2\frac{3}{14}$	$2\frac{19}{24}$	$1\frac{1}{2}$	$4\frac{3}{5}$	$1\frac{2}{5}$	$3\frac{1}{30}$
K	N	I	W	S	U	E	F	T	U	R	N	S	A	D

NAME ____________________

Compare. Use >, <, or =.

1. $\frac{3}{4}$ (<) $\frac{4}{5}$

$$\begin{array}{ccc} \downarrow & & \downarrow \\ \frac{15}{20} & < & \frac{16}{20} \end{array}$$

Write the fractions with a common denominator.

2. $\frac{2}{3}$ ○ $\frac{3}{7}$

3. $\frac{5}{6}$ ○ $\frac{7}{9}$

4. $\frac{7}{12}$ ○ $\frac{1}{2}$

5. $\frac{9}{16}$ ○ $\frac{3}{4}$

6. $\frac{3}{4}$ ○ $\frac{15}{20}$

7. $\frac{5}{6}$ ○ $\frac{7}{8}$

8. $\frac{6}{7}$ ○ $\frac{7}{9}$

9. $\frac{2}{5}$ ○ $\frac{3}{7}$

10. $\frac{1}{3}$ ○ $\frac{2}{7}$

11. $\frac{4}{5}$ ○ $\frac{2}{3}$

12. $\frac{5}{9}$ ○ $\frac{4}{7}$

13. $\frac{5}{8}$ ○ $\frac{7}{16}$

14. $\frac{4}{7}$ ○ $\frac{2}{3}$

15. $\frac{1}{2}$ ○ $\frac{7}{16}$

List in order from the least to the greatest.

16. $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\underline{\;\frac{1}{4}\quad \frac{1}{3}\quad \frac{1}{2}\;}$

$$\begin{array}{ccc} \frac{6}{12} & \frac{4}{12} & \frac{3}{12} \\ \uparrow & & \uparrow \\ \text{greatest} & & \text{least} \end{array}$$

Write the fractions with a common denominator.

17. $\frac{2}{3}$ $\frac{5}{6}$ $\frac{3}{5}$ ____________________

18. $\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{7}$ ____________________

19. $\frac{4}{5}$ $\frac{3}{4}$ $\frac{17}{20}$ ____________________

20. $\frac{8}{9}$ $\frac{5}{6}$ $\frac{7}{12}$ ____________________

21. $\frac{4}{9}$ $\frac{7}{12}$ $\frac{3}{4}$ ____________________

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 7

B. Topic: Fractions -- Adding and Subtracting

C. Prerequisite: Comparing Fractions

D. Purpose: To Add and Subtract Fractions

E. Performance Objective: The student should be able to add and subtract fractions.

1. Activity:
   a. The student will practice exercises 1-24 Unit 7.
   b. The student will practice exercises 1-6 in solving word problems.

2. Conditions: Classroom

3. Standards: 80% on practice exercises

F. ______________________________

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: VII

I. Adding And Subtracting Fractions

- A. Like Fractions
  - 1. Same or common denominator
  - 2. Add or subtract numerator
- B. Unlike Fractions
  - 1. Find least common denominator and make like fraction
  - 2. Add or subtract the like fractions
  - 3. Reduce answer if necessary
- C. Adding and Subtracting Mixed Numbers
  - 1. Write the fraction with common denominators
  - 2. Add or subtract the fractions, then add or subtract the whole numbers
  - 3. If the sum of the fraction is improper, change it to a mixed number and combine it with the whole number
  - 4. Reduce to lowest terms if necessary
- D. Strategies for Solving Word Problems
  - 1. Read
  - 2. Plan
  - 3. Do
  - 4. Check

NAME

What kind of lion barks but doesn't roar?

Subtract. Then connect your answers in order.

1. $$\begin{array}{rcr} \frac{7}{8} & = & \frac{7}{8} \\ -\frac{1}{4} & = & -\frac{2}{8} \\ \hline & & \frac{5}{8} \end{array}$$

Common denominator

2. $$\begin{array}{rcr} 5\frac{1}{3} & = & 5\frac{2}{6} \\ -2\frac{1}{6} & = & -2\frac{1}{6} \\ \hline & & 3\frac{1}{6} \end{array}$$

3. $$\begin{array}{r} \frac{3}{4} \\ -\frac{1}{2} \\ \hline \end{array}$$

4. $$\begin{array}{r} \frac{5}{6} \\ -\frac{1}{4} \\ \hline \end{array}$$

5. $$\begin{array}{r} \frac{1}{2} \\ -\frac{1}{3} \\ \hline \end{array}$$

6. $$\begin{array}{r} \frac{2}{3} \\ -\frac{1}{4} \\ \hline \end{array}$$

7. $$\begin{array}{r} \frac{1}{2} \\ -\frac{3}{8} \\ \hline \end{array}$$

8. $$\begin{array}{r} \frac{4}{5} \\ -\frac{7}{10} \\ \hline \end{array}$$

9. $$\begin{array}{r} \frac{2}{3} \\ -\frac{3}{5} \\ \hline \end{array}$$

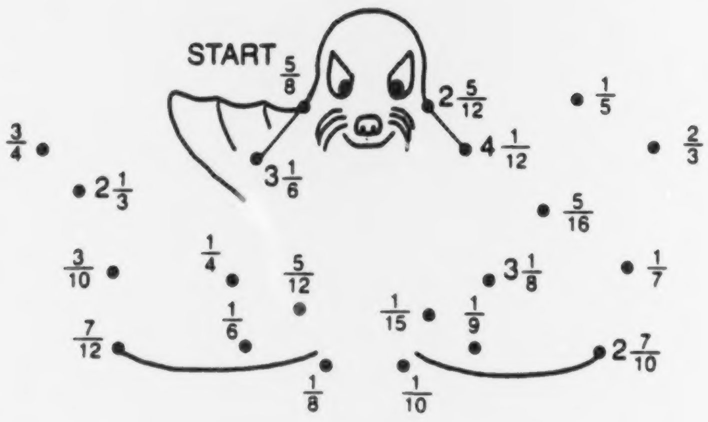
10. $$\begin{array}{r} \frac{7}{9} \\ -\frac{2}{3} \\ \hline \end{array}$$

11. $$\begin{array}{r} 4\frac{9}{10} \\ -2\frac{1}{5} \\ \hline \end{array}$$

12. $$\begin{array}{r} 8\frac{5}{8} \\ -5\frac{1}{2} \\ \hline \end{array}$$

13. $$\begin{array}{r} 7\frac{1}{3} \\ -3\frac{1}{4} \\ \hline \end{array}$$

14. $$\begin{array}{r} 6\frac{3}{4} \\ -4\frac{1}{3} \\ \hline \end{array}$$



NAME ______________________________

Subtract.

6 is a common denominator.

Rename.

$$\begin{array}{rcrcr} 7\frac{1}{3} & = & 7\frac{2}{6} & = & 6\frac{8}{6} \\ -\,5\frac{1}{2} & = & 5\frac{3}{6} & = & 5\frac{3}{6} \\ \hline & & & & 1\frac{5}{6} \end{array}$$

1. $7\frac{1}{2} - 5\frac{2}{3}$

2. $8\frac{1}{3} - 2\frac{5}{9}$

3. $4\frac{1}{4} - 2\frac{5}{8}$

4. $7\frac{1}{9} - 1\frac{13}{18}$

5. $7\frac{1}{6} - 2\frac{5}{12}$

6. $5\frac{1}{5} - \frac{13}{15}$

7. $9\frac{2}{3} - 6\frac{5}{6}$

8. $1\frac{1}{3} - \frac{3}{4}$

9. $6\frac{5}{16} - 4\frac{7}{8}$

10. $9\frac{5}{9} - 3\frac{2}{3}$

11. $3\frac{3}{10} - 2\frac{4}{5}$

12. $9\frac{1}{5} - 6\frac{1}{3}$

13. $4\frac{2}{9} - 2\frac{1}{3}$

14. $5\frac{1}{6} - 1\frac{2}{3}$

15. $8\frac{1}{4} - 5\frac{5}{8}$

16. $7\frac{1}{3} - 2\frac{4}{5}$

17. $6\frac{1}{3} - 3\frac{5}{6}$

18. $10\frac{2}{3} - 6\frac{3}{4}$

19. $7\frac{3}{5} - 1\frac{9}{10}$

20. $2\frac{1}{8} - 1\frac{1}{4}$

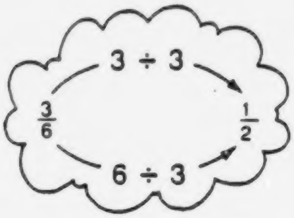
21. $6\frac{1}{6} - 5\frac{1}{3}$

22. $10\frac{1}{2} - 2\frac{3}{5}$

NAME ____

Tell if each fraction is in lowest terms.
Write *yes* or *no*.

1. $\frac{3}{6}$ no



2. $\frac{1}{3}$ ________

3. $\frac{2}{5}$ ________

4. $\frac{2}{6}$ ________

5. $\frac{4}{9}$ ________

6. $\frac{4}{13}$ ________

7. $\frac{6}{15}$ ________

8. $\frac{4}{12}$ ________

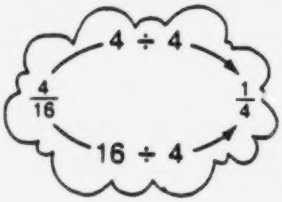
9. $\frac{7}{14}$ ________

10. $\frac{3}{7}$ ________

11. $\frac{3}{9}$ ________

Write each fraction in lowest terms.

12. $\frac{4}{16}$ $\frac{1}{4}$



13. $\frac{5}{20}$ ________

14. $\frac{6}{9}$ ________

15. $\frac{2}{12}$ ________

16. $\frac{10}{25}$ ________

17. $\frac{12}{36}$ ________

18. $\frac{18}{24}$ ________

19. $\frac{16}{20}$ ________

20. $\frac{8}{14}$ ________

21. $\frac{11}{22}$ ________

22. $\frac{14}{28}$ ________

23. $\frac{9}{27}$ ________

24. $\frac{18}{26}$ ________

25. $\frac{7}{21}$ ________

26. $\frac{10}{14}$ ________

NAME ____

Write an improper fraction for each mixed number or whole number.

1. $\overset{+}{\underset{\times}{3\frac{1}{4}}} = \frac{\boxed{13}}{4}$

First, 4 × 3 = 12
Then 12 + 1 = 13

2. $\overset{+}{\underset{\times}{3\frac{2}{5}}} = \frac{\boxed{17}}{5}$

3. $5 = \frac{\boxed{}}{2}$

4. $7 = \frac{\boxed{}}{4}$

5. $2\frac{3}{8} = \frac{\boxed{}}{8}$

6. $4\frac{2}{3} = \frac{\boxed{}}{3}$

7. $1\frac{1}{4} = \frac{\boxed{}}{4}$

8. $5\frac{1}{6} = \frac{\boxed{}}{6}$

9. $7\frac{2}{3} = \frac{\boxed{}}{3}$

10. $6\frac{1}{4} = \frac{\boxed{}}{4}$

11. $2\frac{5}{6} = \frac{\boxed{}}{6}$

What do you find in a marching band and a flock of turkeys?

Write an improper fraction for each mixed number. Then find your answer below. Write the letter for that answer. One answer is used twice.

12. $2\frac{5}{8}$ ____ U

13. $1\frac{7}{9}$ ____ C

14. $3\frac{2}{3}$ ____ T

15. $6\frac{5}{6}$ ____ M

16. $4\frac{2}{5}$ ____ K

17. $2\frac{3}{4}$ ____ D

18. $1\frac{8}{9}$ ____ S

19. $5\frac{1}{10}$ ____ I

20. $5\frac{4}{7}$ ____ R

____	____	____	____	____	____	____	____	____	____
$\frac{11}{4}$	$\frac{39}{7}$	$\frac{21}{8}$	$\frac{41}{6}$	$\frac{17}{9}$	$\frac{11}{3}$	$\frac{51}{10}$	$\frac{16}{9}$	$\frac{22}{5}$	$\frac{17}{9}$

NAME ________________________________

Rename each fraction or mixed number.

1. $\frac{5}{3}$ $1\frac{2}{3}$

$$\begin{array}{r} 1\frac{2}{3} \\ 3\overline{)\,5} \\ -3 \\ \hline 2 \end{array}$$

2. $1\frac{9}{4}$ $3\frac{1}{4}$

$1 + 2\frac{1}{4} = 3\frac{1}{4}$

$$\begin{array}{r} 2\frac{1}{4} \\ 4\overline{)\,9} \\ -8 \\ \hline 1 \end{array}$$

3. $\frac{10}{3}$ ________

4. $2\frac{3}{3}$ ________

5. $\frac{8}{5}$ ________

6. $6\frac{9}{7}$ ________

7. $\frac{12}{10}$ ________

8. $5\frac{15}{5}$ ________

9. $\frac{9}{9}$ ________

10. $\frac{13}{8}$ ________

11. $2\frac{4}{3}$ ________

12. $\frac{15}{7}$ ________

13. $4\frac{16}{4}$ ________

14. $\frac{19}{6}$ ________

What is the lowest place on earth?

Add. Then find your answer below. Write the letter for that number. Two answers are used twice.

15. $2\frac{4}{7} + 3\frac{5}{7}$ = $5\frac{9}{7}$ **D**

$= 6\frac{2}{7}$

16. $3\frac{2}{5} + 1\frac{3}{5}$ **H**

17. $\frac{5}{8} + \frac{6}{8}$ **E**

18. $4\frac{1}{3} + 5\frac{2}{3}$ **T**

19. $3\frac{4}{9} + 4\frac{8}{9}$ **S**

20. $\frac{9}{10} + \frac{8}{10}$ **E**

21. $6\frac{3}{4} + 7\frac{2}{4}$ **E**

22. $8\frac{5}{6} + 3\frac{3}{6}$ **A**

			D			D			
10	5	$1\frac{7}{10}$	$6\frac{2}{7}$	$1\frac{3}{8}$	$12\frac{1}{3}$	$6\frac{2}{7}$	$8\frac{1}{3}$	$14\frac{1}{4}$	$12\frac{1}{3}$

NAME

Add.

1. $\begin{array}{r} 1\frac{3}{4} = 1\frac{6}{8} \\ +2\frac{1}{8} = +2\frac{1}{8} \\ \hline 3\frac{7}{8} \end{array}$

Write the fractions with a common denominator. Add.

2. $\begin{array}{r} \frac{1}{3} \\ +\frac{1}{2} \\ \hline \end{array}$

3. $\begin{array}{r} \frac{2}{5} \\ +\frac{1}{3} \\ \hline \end{array}$

4. $\begin{array}{r} 2\frac{2}{3} \\ +2\frac{1}{4} \\ \hline \end{array}$

5. $\begin{array}{r} 4\frac{1}{6} \\ +3\frac{1}{2} \\ \hline \end{array}$

6. $\begin{array}{r} \frac{3}{8} \\ +\frac{1}{2} \\ \hline \end{array}$

7. $\begin{array}{r} \frac{4}{9} \\ +\frac{1}{3} \\ \hline \end{array}$

8. $\begin{array}{r} \frac{1}{3} = \frac{4}{12} \\ +\frac{3}{4} = +\frac{9}{12} \\ \hline \frac{13}{12} = 1\frac{1}{12} \end{array}$

A common denominator is 12.

9. $\begin{array}{r} 1\frac{3}{4} \\ +2\frac{1}{2} \\ \hline \end{array}$

10. $\begin{array}{r} 3\frac{1}{3} \\ +8\frac{4}{5} \\ \hline \end{array}$

11. $\begin{array}{r} 7\frac{2}{3} \\ +1\frac{2}{9} \\ \hline \end{array}$

12. $\begin{array}{r} 4\frac{1}{5} \\ +5\frac{2}{3} \\ \hline \end{array}$

13. $\begin{array}{r} 9\frac{1}{4} \\ +2\frac{1}{2} \\ \hline \end{array}$

14. $\begin{array}{r} 6\frac{1}{8} \\ +3\frac{1}{4} \\ \hline \end{array}$

15. $\begin{array}{r} 1\frac{3}{10} \\ +8\frac{1}{5} \\ \hline \end{array}$

16. $\begin{array}{r} 2\frac{1}{4} \\ +4\frac{1}{3} \\ \hline \end{array}$

17. $\begin{array}{r} 5\frac{5}{8} \\ +6\frac{1}{4} \\ \hline \end{array}$

18. $\begin{array}{r} 5\frac{1}{6} \\ +3\frac{1}{2} \\ \hline \end{array}$

19. $\begin{array}{r} 5\frac{7}{10} \\ +3\frac{1}{5} \\ \hline \end{array}$

20. $\begin{array}{r} 7\frac{2}{3} \\ +6\frac{1}{9} \\ \hline \end{array}$

21. $\begin{array}{r} 4\frac{3}{4} \\ +2\frac{2}{3} \\ \hline \end{array}$

22. $\begin{array}{r} 2\frac{1}{5} \\ +3\frac{1}{2} \\ \hline \end{array}$

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 8

B. Topic: Fractions -- Multiplying and Dividing

C. Prerequisite: Adding and Subtracting Fractions

D. Purpose: To Multiply and Divide Fractions

E. Performance Objective: The student should be able to demonstrate the ability to multiply and divide fractions.

1. Activity:
   - a. The student will practice exercises 1-32 Unit 8.
   - b. The student will practice exercises 1-6 Unit 8 in solving word problems.
   - c. The student will complete a quiz.

2. Conditions: Classroom

3. Standards: 80% on practice exercises and quiz

F. ____
(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: VIII

I. Multiplying And Dividing Fractions

- A. Multiplying
    1. Change a mixed number to an improper fraction. Write a whole number as a fraction with a denominator of 1.
    2. Multiply the numerators
    3. Multiply the denominators
    4. Reduce the fraction to lowest terms. Write improper fractions as mixed numbers.
- B. Dividing Fractions
    1. Change any mixed number to improper fractions. Write a whole number as a fraction with a denominator of 1.
    2. Invert the divisor and multiply
    3. Complete the problem as any multiplication problem and reduce to lowest. terms.

NAME ______________________________

CODE

△ $2\frac{1}{2}$	⬡ $1\frac{2}{3}$	◇ $3\frac{3}{4}$	○ $4\frac{2}{5}$	⬭ 4
⇨ $\frac{7}{8}$	⇦ $2\frac{4}{5}$	▭ $1\frac{5}{6}$	⌂ $5\frac{3}{8}$	⏢ $\frac{1}{4}$

Multiply. Use the code to solve each problem.

1. △ × ⬡ = $4\frac{1}{6}$

4+1 3+2

$2\frac{1}{2} \times 1\frac{2}{3}$

2x2 3x1

$\frac{5}{2} \times \frac{5}{3} = \frac{25}{6} = 4\frac{1}{6}$

2. ◇ × ⬭ = 15

12+3

$3\frac{3}{4} \times \frac{4}{1} = \frac{15}{\cancel{4}_1} \times \frac{\cancel{4}^1}{1} = 15$

4x3

3. ⇨ × ⬭ = ____________

4. ○ × ▭ = ____________

5. ⌂ × ⏢ = ____________

6. △ × ◇ = ____________

7. ⬡ × ⬡ = ____________

8. ⌂ × ⇦ = ____________

9. △ × ⬭ = ____________

10. ⏢ × △ = ____________

NAME ______________________________

Divide.

1. $4\frac{3}{8} \div 1\frac{1}{4}$ $3\frac{1}{2}$

$\frac{35}{8} \div \frac{5}{4}$

$\frac{35}{8} \times \frac{4}{5}$

$\frac{\overset{7}{\cancel{35}}}{\underset{2}{\cancel{8}}} \times \frac{\overset{1}{\cancel{4}}}{\underset{1}{\cancel{5}}} = \frac{7}{2} = 3\frac{1}{2}$

2. $1\frac{5}{7} \div 6$ ______

$7+5$

7×1

$\frac{12}{7} \div \frac{6}{1}$

Change to multiplication by the reciprocal.

3. $1\frac{1}{2} \div 4$ ______

4. $4\frac{3}{4} \div 1\frac{1}{8}$ ______

5. $2\frac{2}{3} \div 2$ ______

6. $6 \div 1\frac{1}{4}$ ______

7. $2\frac{2}{5} \div 1\frac{1}{4}$ ______

8. $1\frac{4}{5} \div 3\frac{1}{3}$ ______

9. $1 \div 2\frac{5}{6}$ ______

10. $3\frac{3}{4} \div \frac{5}{6}$ ______

11. $\frac{4}{7} \div 2\frac{4}{5}$ ______

12. $11\frac{2}{3} \div 5\frac{1}{4}$ ______

13. $2\frac{2}{11} \div 2\frac{2}{5}$ ______

14. $13\frac{3}{4} \div 10$ ______

Divide across. Divide down.

÷

$1\frac{1}{2}$	$2\frac{1}{4}$	**15.**
3	$2\frac{2}{3}$	**16.**
17.	**18.**	**19.**

÷

$\frac{4}{5}$	$2\frac{3}{4}$	**20.**
$1\frac{1}{3}$	$1\frac{1}{2}$	**21.**
22.	**23.**	**24.**

÷

4	$2\frac{5}{6}$	**25.**
$\frac{3}{8}$	$1\frac{1}{8}$	**26.**
27.	**28.**	**29.**

NAME ______________________________

Multiply.

1. $1\frac{3}{4} \times 2$ ____ $\frac{7}{4} \times \frac{2}{1} = \frac{14}{4} = 3\frac{2}{4} = 3\frac{1}{2}$

2. $1\frac{1}{3} \times 2\frac{1}{2} =$ $3\frac{1}{3}$

First write the numbers as fractions.

Then multiply.

$\frac{4}{3} \times \frac{5}{2} = \frac{20}{6} = 3\frac{2}{6} = 3\frac{1}{3}$

3. $2\frac{2}{3} \times \frac{1}{2}$ ____

4. $2\frac{1}{5} \times 1\frac{1}{5}$ ____

5. $1\frac{1}{4} \times 1\frac{1}{3}$ ____

6. $1\frac{1}{3} \times 3\frac{1}{2}$ ____

7. $9\frac{2}{5} \times 4\frac{1}{2}$ ____

8. $3 \times 1\frac{2}{7}$ ____

9. $6\frac{1}{2} \times \frac{3}{5}$ ____

10. $5 \times 1\frac{3}{8}$ ____

What do an ostrich and a penguin have in common?

Multiply. Then find your answer below. Circle the letter for each exercise to answer the riddle. One answer is not used.

11. $1\frac{1}{2} \times 2\frac{1}{2}$ ____

12. $5\frac{1}{2} \times \frac{1}{4}$ ____

13. $2\frac{2}{5} \times 2$ ____

14. $\frac{3}{4} \times 1\frac{1}{3}$ ____

15. $2\frac{3}{8} \times \frac{1}{2}$ ____

16. $3\frac{1}{2} \times 4\frac{1}{2}$ ____

17. $2\frac{3}{5} \times 1\frac{1}{2}$ ____

18. $3\frac{1}{3} \times 2\frac{2}{3}$ ____

19. $4\frac{4}{5} \times 2\frac{1}{2}$ ____

20. $5 \times 2\frac{4}{9}$ ____

21. $3\frac{1}{2} \times 6\frac{1}{4}$ ____

22. $1\frac{3}{4} \times 1\frac{2}{5}$ ____

T	T	H	E	S	Y	N'	C	A	B	N'	O	T	E	F	A	L	Y
$1\frac{3}{16}$	$3\frac{1}{3}$	$4\frac{4}{5}$	$2\frac{9}{20}$	$1\frac{5}{8}$	$3\frac{9}{10}$	$6\frac{1}{4}$	12	1	$10\frac{5}{6}$	$15\frac{3}{4}$	16	$1\frac{3}{8}$	$9\frac{1}{3}$	$21\frac{7}{8}$	$13\frac{1}{2}$	$8\frac{8}{9}$	$12\frac{2}{9}$

NAME ____

Divide.

1. $\overset{+}{\underset{\times}{2\frac{1}{3}}} \div \frac{1}{4}$ $9\frac{1}{3}$

First write both numbers as fractions.

$\frac{7}{3} \div \frac{1}{4}$

$\frac{7}{3} \times \frac{4}{1} = \frac{28}{3} = 9\frac{1}{3}$

2. $1\frac{1}{2} \div \frac{1}{2}$ ______

3. $2\frac{1}{4} \div \frac{1}{2}$ ______

4. $3\frac{1}{2} \div 1\frac{1}{2}$ ______

5. $2\frac{2}{5} \div \frac{1}{3}$ ______

6. $7\frac{1}{2} \div \frac{1}{4}$ ______

7. $2\frac{1}{4} \div \frac{2}{3}$ ______

8. $\overset{+}{\underset{\times}{3\frac{1}{4}}} \div 3$ $1\frac{1}{12}$

$\frac{13}{4} \div \frac{3}{1}$

$\frac{13}{4} \times \frac{1}{3} = \frac{13}{12} = 1\frac{1}{12}$

9. $3\frac{1}{2} \div 2$ ______

10. $1\frac{1}{3} \div 2$ ______

11. $3\frac{3}{4} \div 2$ ______

12. $6 \div 2\frac{1}{3}$ ______

13. $4 \div 3\frac{1}{3}$ ______

14. $5\frac{1}{2} \div 2$ ______

15. $6\frac{2}{5} \div 1\frac{1}{3}$ ______

16. $9\frac{1}{3} \div 3\frac{1}{2}$ ______

17. $1\frac{2}{3} \div 3$ ______

18. $2\frac{1}{7} \div 2$ ______

19. $5 \div 3\frac{1}{8}$ ______

20. $3\frac{2}{3} \div 1\frac{1}{4}$ ______

21. $7 \div 2\frac{1}{4}$ ______

22. $2 \div 2\frac{3}{7}$ ______

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 9

B. Topic: Decimals

C. Prerequisite: Fractions

D. Purpose: Place Values, Comparing, and Rounding

E. Performance Objective: The student should be able to perform mathematical functions using decimals.

1. Activity:
   a. The student will complete xercises 1-34 Unit 9.
   b. The student will complete exercises 1-5 in word problems,
2. Conditions: Classroom
3. Standards: 80% on practice exercises

F. ______________________________

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: IX

I. Decimals
  - A. Place Values, Comparing, and Rounding
    1. Express fractions with decimal numbers
    2. Parts of a whole
    3. Decimal places
  - B. Reading Decimals
    1. Read the whole number part
    2. "And" indicated the decimal point
    3. Read the digits to the right of the decimal point as a whole number
    4. Say the place name of the last digit on the right
  - C. Comparing and Ordering Decimals
    1. Compare decimals as whole numbers
    2. Use zeros to the right of the decimal with fewer digits so the numbers have the same number of decimal places
    3. Always compare the whole numbers first
  - D. Rounding
    1. Use same rules as whole numbers
    2. Round when exact amounts are not needed
  - E. Solving Word Problems
    1. Use estimations with money
       - a. Find approximate amount
       - b. Round to nearest dollar
    2. Round when exact amounts are not needed

NAME

Put the decimal point in the correct position.

```
        3 1 . 3
1.  5 ) 1 5 6 . 5
      - 1 5
        0 6
      -   5
          1   5
        - 1   5
              0
```

Put a decimal point above the decimal point in the dividend.

```
        0   4
2.  3 ) 1 . 2
      - 1   2
            0
```

```
        6   1
3.  5 ) 3 0 . 5
      - 3 0
          0   5
        -     5
              0
```

```
        0   4 1
4.  7 ) 2 . 8 7
      - 2   8
            0 7
          -   7
              0
```

```
          6   0 9
5.  6 ) 3 6 . 5 4
      - 3 6
          0   5 4
        -     5 4
                0
```

```
        0   6 0 9
6.  6 ) 3 . 6 5 4
      - 3   6
            0 5 4
          -   5 4
                0
```

```
        6 0   9
7.  6 ) 3 6 5 . 4
      - 3 6
          0 5   4
        -   5   4
                0
```

What has teeth but never bites?
To find out, divide. Then find your answer below.
Shade in that segment. Each answer is used twice.

8. 2) 151.4

9. 5) 8.25

10. 3) 28.11

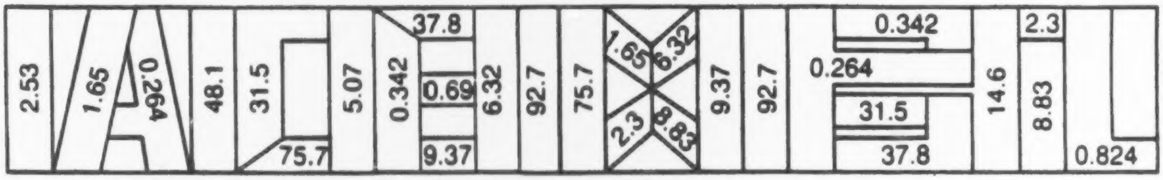
11. 4) 151.2

12. 8) 2.112

13. 6) 189.0

14. 7) 2.394

15. 9) 56.88


2.53
1.65
0.264
48.1
31.5
75.7
5.07
0.342
37.8
0.69
9.37
6.32
92.7
75.7
1.65
6.32
2.3
8.83
9.37
92.7
0.342
0.264
31.5
37.8
14.6
2.3
8.83
0.824

NAME

Put the decimal point in the correct position.

4 0.2
1. 0.2)8.04

Move 1 decimal place; then directly above

0.6
2. 0.06)0.036

Move 2 decimal places; then directly above

2 06
3. 0.3)6.18

035
4. 0.05)0.0175

3 28
5. 0.4)13.12

07
6. 0.07)0.049

2 1
7. 2.5)52.5

251
8. 0.13)0.3263

15
9. 0.43)0.645

Divide.

10. 0.6)0.36
11. 0.4)9.6
12. 0.03)0.111
13. 0.8)16

14. 0.02)0.012
15. 0.3)0.9
16. 1.8)37.8
17. 0.24)1.344

18. 0.09)13.77
19. 0.05)0.265
20. 0.7)47.6
21. 0.4)14.16

NAME ______________________________

When it rains cats and dogs, what do you find in the streets?

Subtract. Then connect your answers below in order.

1. $$\begin{array}{r} 32.10 \\ -\ 2.03 \\ \hline 30.07 \end{array}$$

2. $$\begin{array}{r} 7.342 \\ -2.600 \\ \hline 4.742 \end{array}$$

3. $$\begin{array}{r} 55.18 \\ -\ 4.3 \\ \hline \end{array}$$

4. $$\begin{array}{r} 2.139 \\ -0.5 \\ \hline \end{array}$$

5. $$\begin{array}{r} 9.3 \\ -6.2 \\ \hline \end{array}$$

6. $$\begin{array}{r} 4.87 \\ -3.08 \\ \hline \end{array}$$

7. $$\begin{array}{r} 5.26 \\ -4.8 \\ \hline \end{array}$$

8. $$\begin{array}{r} 5.8 \\ -1.95 \\ \hline \end{array}$$

9. 25.6 − 18.54 ____7.06____

$$\begin{array}{r} 25.60 \\ -18.54 \\ \hline 7.06 \end{array}$$

Line up the decimal points.
25.6 = 25.60

10. 1.39 − 0.45 ______________

$$\begin{array}{r} 1.39 \\ -0.45 \\ \hline \end{array}$$

Line up the decimal points.

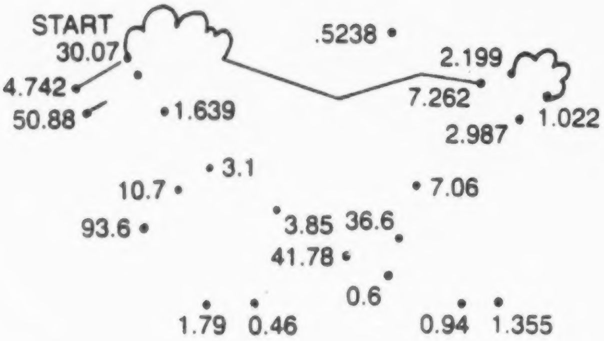
11. 3.415 − 2.06 ______________

12. 6.087 − 3.1 ______________

13. 6.278 − 5.256 ______________

14. 8.9 − 6.701 ______________

15. 8.942 − 1.68 ______________


START
30.07
4.742
50.88
1.639
.5238
2.199
7.262
2.987
1.022
3.1
10.7
7.06
93.6
3.85
36.6
41.78
0.6
1.79
0.46
0.94
1.355

NAME ____________________

1. Find 23.6 + 45.2

2. Find 20.15 + 3.

Line up the decimals. Add.

$$\begin{array}{r} 23.6 \\ +45.2 \\ \hline \end{array} \qquad \begin{array}{r} 23.6 \\ +45.2 \\ \hline 68.8 \end{array} \qquad \begin{array}{r} 20.15 \\ +\ \ 3.00 \\ \hline 23.15 \end{array}$$

Write the extra zeros. Put the decimal point in your answer.

What has seconds but no firsts? To find out, add. Then find your answer below. Shade in that segment. Two answers are used twice.

3. $\begin{array}{r} 36.3 \\ +\ 5.7 \\ \hline 42.0 \end{array}$

4. $\begin{array}{r} 18.4 \\ +56.3 \\ \hline \end{array}$

5. $\begin{array}{r} 7.62 \\ +43.55 \\ \hline \end{array}$

6. $\begin{array}{r} 26.3 \\ +\ 1.4 \\ \hline \end{array}$

7. $\begin{array}{r} 32.53 \\ +\ 5.06 \\ \hline \end{array}$

8. $\begin{array}{r} 2.25 \\ +1.80 \\ \hline \end{array}$ 1.8 = 1.80

9. $\begin{array}{r} 0.83 \\ +4.247 \\ \hline \end{array}$

10. $\begin{array}{r} 49.3 \\ +\ 1.56 \\ \hline \end{array}$

11. $\begin{array}{r} 0.08 \\ +28.1\ \\ \hline \end{array}$

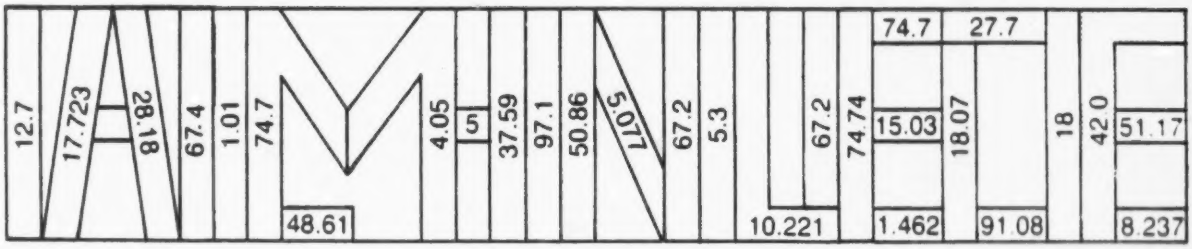
12. $\begin{array}{r} 5.47 \\ +12.6\ \\ \hline \end{array}$

13. $\begin{array}{r} 11.023 \\ +\ 6.7\ \ \ \\ \hline \end{array}$

14. $\begin{array}{r} 3.921 \\ +6.3\ \ \ \\ \hline \end{array}$

15. 8.23 + 0.007 ____________________

16. 62.3 + 4.9 ____________________


12.7
17.723
28.18
67.4
1.01
74.7
48.61
4.05
5
37.59
97.1
50.86
5.077
67.2
5.3
10.221
67.2
74.74
74.7
27.7
15.03
1.462
18.07
91.08
18
42.0
51.17
8.237

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 10

B. Topic: Decimals

C. Prerequisite: Place Values, Comparing, and Rounding

D. Purpose: Decimal Operations

E. Performance Objective: The student should be able to apply rules for decimal operations.

1. Activity:
   a. The student will complete xercises 1-30 Unit 10.
   b. The student will bomplete exercises 1-6 Unit 10 in word problems.
2. Conditions: Classroom
3. Standards: 80% on practice exercises

F. ________________________________
(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math

B. Lecture Number: X

I. Decimal Operations

- A. Adding and Subtracting Decimals
  1. Align decimal points
  2. Zeros to right of last digit
  3. Number without decimal point is understood to have one to the right of the ones place
  4. Add or subtract as you would with whole numbers
  5. Line up the decimal point in the answer with the decimal points in the problem
- B. Multiplying Decimals
  1. Multiply as you would with whole numbers. Ignore decimal points until finished.
  2. Count the decimal places in the original problem to find out how many places are needed in the answer
  3. Count decimal points from the right and place in the answer
- C. Dividing Decimals
  1. Place the decimal point in the answer directly above the decimal point in the problem
  2. Divide as you would with whole numbers
  3. When a problem shows a remainder, write a zero to the right of the number you are dividing and continue until you reach the needed place value. Carry out division one place to the right of the desired place value, then round.
- D. Multiplying and Dividing by Powers of Ten
  1. Count the number of zeros in the power of ten
  2. Multiply by moving the decimal point the same number of places to the right
  3. Divide by moving the decimal the same number of places to the left
- E. Solving Multi-Step Word Problems
  1. Decide which operations are required (add, subtract, etc.)
     - a. First do multiplication and division operations in order from left to right
     - b. Then do the addition and subtraction operations in order from left to right
  2. Order of operations
     - a. Do the operations in the parenthesis first
     - b. Do the division
     - c. Then do the subtraction

NAME ____________________

1. Find 2.15 × 0.008.

2.15 ← 2 decimal places
× 0.008 ← 3 decimal places
0.01720 ← 5 decimal places

Write an extra zero to show
5 decimal places.

2. Find 0.105 × 0.045

0.105 ← 3 decimal places
× 0.045 ← 3 decimal places
525
4200
0.004725 ← 6 decimal places

Multiply.

3. 1.52
×0.03
0.0456

4. 2.45
×0.02

5. 4.13
×0.004

6. 3.16
×0.02

7. 0.172
× 0.4

8. 3.26
×0.006

9. 0.261
× 0.03

10. 0.13
×0.009

11. 0.05
×0.39

12. 0.007
× 0.09

13. 0.58
×0.03

14. 2.15
×0.007

15. 0.03
×0.07

16. 1.07
×0.06

17. 3.19
×0.02

18. 0.03
×0.002

19. 0.014
× 2.3

20. 0.723
× 1.5

21. 0.125
× 0.32

22. 0.12
×0.045

NAME ________________________________

Multiply.

1. 10 × 2.4 24
100 × 2.4 240
1000 × 2.4 2400

2.4 ← 1 decimal place
× 10 ← 0 decimal places
24.0 ← 1 decimal place

2. 10 × 2.36 23.6
100 × 2.36 236
1000 × 2.36 2360

3. 10 × 8.5 85

8.5 → 85

4. 100 × 23.7 2370

23.70 → 2370

5. 1000 × 41.6 ________________

6. 10 × 0.002 ________________

What kind of shoes should a thief wear? Multiply. Then find your answers below. Circle the letters in those boxes.

7. 100 × 1.563 ________________

8. 1000 × 98.2 ________________

9. 10 × 0.61 ________________

10. 1000 × 0.0087 ________________

11. 100 × 1.38 ________________

12. 10 × 27.56 ________________

13. 10 × 0.02 ________________

14. 100 × 31.9 ________________

T	S	I	N	E	M	A	K	L	E	R	J	S
0.65	138	384	0.2	156.3	0.058	6.1	3190	17.2	98,200	275.6	4.9	8.7

NAME

Put the decimal point in the correct position.

1.
```
    31 . 3
5 ) 156 . 5
  - 15
     06
   -  5
      1 5
    - 1 5
        0
```

Put a decimal point above the decimal point in the dividend.

2.
```
     0 4
3 ) 1 . 2
   - 1 2
       0
```

3.
```
      6 1
5 ) 3 0 . 5
  - 3 0
      0 5
    -   5
        0
```

4.
```
    0 41
7 ) 2.87
  - 2 8
     07
   -  7
      0
```

5.
```
      6 09
6 ) 36.54
  - 36
     0 54
   -   54
        0
```

6.
```
    0 609
6 ) 3.654
  - 3 6
      054
   -   54
        0
```

7.
```
     60 9
6 ) 365.4
  - 36
     05 4
   -  5 4
        0
```

What has teeth but never bites?
To find out, divide. Then find your answer below.
Shade in that segment. Each answer is used twice.

8. 2) 151.4

9. 5) 8.25

10. 3) 28.11

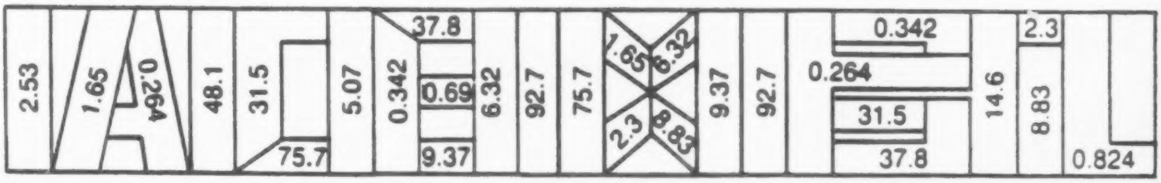
11. 4) 151.2

12. 8) 2.112

13. 6) 189.0

14. 7) 2.394

15. 9) 56.88


2.53
1.65
0.264
48.1
31.5
75.7
5.07
0.342
37.8
0.69
9.37
6.32
92.7
75.7
1.65
6.32
2.3
8.83
9.37
92.7
0.342
0.264
31.5
37.8
14.6
2.3
8.83
0.824

NAME

Put the decimal point in the correct position.

1. $\begin{array}{r}4\;0.2\\0.2\overline{)8.04}\end{array}$

Move 1 decimal place; then directly above

2. $\begin{array}{r}0.6\\0.06\overline{)0.036}\end{array}$

Move 2 decimal places; then directly above

3. $\begin{array}{r}2\;06\\0.3\overline{)6.18}\end{array}$

4. $\begin{array}{r}035\\0.05\overline{)0.0175}\end{array}$

5. $\begin{array}{r}3\;28\\0.4\overline{)13.12}\end{array}$

6. $\begin{array}{r}07\\0.07\overline{)0.049}\end{array}$

7. $\begin{array}{r}2\;1\\2.5\overline{)52.5}\end{array}$

8. $\begin{array}{r}251\\0.13\overline{)0.3263}\end{array}$

9. $\begin{array}{r}15\\0.43\overline{)0.645}\end{array}$

Divide.

10. $0.6\overline{)0.36}$

11. $0.4\overline{)9.6}$

12. $0.03\overline{)0.111}$

13. $0.8\overline{)16}$

14. $0.02\overline{)0.012}$

15. $0.3\overline{)0.9}$

16. $1.8\overline{)37.8}$

17. $0.24\overline{)1.344}$

18. $0.09\overline{)13.77}$

19. $0.05\overline{)0.265}$

20. $0.7\overline{)47.6}$

21. $0.4\overline{)14.16}$

NAME ______________________________

SKILL DRILL

Add.

1. $$\begin{array}{r} 1\;1 \\ 7.86 \\ +3.79 \\ \hline 11.65 \end{array}$$

2. $$\begin{array}{r} 57.6 \\ +68.9 \\ \hline \end{array}$$

3. $$\begin{array}{r} 5.74 \\ +0.38 \\ \hline \end{array}$$

4. $$\begin{array}{r} 0.933 \\ +0.256 \\ \hline \end{array}$$

5. $$\begin{array}{r} 93.4 \\ +25.9 \\ \hline \end{array}$$

6. $$\begin{array}{r} 36.82 \\ +\ 5.93 \\ \hline \end{array}$$

7. $$\begin{array}{r} 759.2 \\ +\ 88.8 \\ \hline \end{array}$$

8. $$\begin{array}{r} 3.784 \\ +0.916 \\ \hline \end{array}$$

9. $$\begin{array}{r} 59.38 \\ +\ 2.57 \\ \hline \end{array}$$

10. $$\begin{array}{r} 629.4 \\ +\ 57.8 \\ \hline \end{array}$$

11. $$\begin{array}{r} 25.1 \\ 38.4 \\ 59.2 \\ +16.5 \\ \hline \end{array}$$

12. $$\begin{array}{r} 5.93 \\ 8.26 \\ 7.61 \\ +4.58 \\ \hline \end{array}$$

13. $$\begin{array}{r} 0.963 \\ 0.178 \\ 0.420 \\ +0.560 \\ \hline \end{array}$$

14. $$\begin{array}{r} 2.341 \\ 7.158 \\ 4.250 \\ +3.680 \\ \hline \end{array}$$

15. $$\begin{array}{r} 71.35 \\ 20.06 \\ 58.01 \\ +39.49 \\ \hline \end{array}$$

16. 6.9 + 13.8 + 0.5

$$\begin{array}{r} 6.9 \\ 13.8 \\ +\ 0.5 \\ \hline \end{array}$$

17. 28.3 + 2.6 + 1.7

18. 11.9 + 6.4 + 2.1

19. 28.7 + 5.4 + 12.6

20. 3.21 + 2.76 + 14.05

21. 0.72 + 8.96 + 10.22

22. 6.27 + 10.91 + 42.25

23. 7.39 + 42.06 + 1.65

24. 0.29 + 1.63 + 12.42

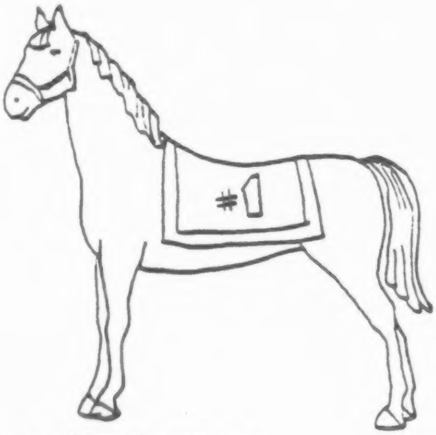
Check yourself. Here are the scrambled answers:

1.189 2.121 4.700 6.12 11.65 14.34 17.429 19.90 20.02 20.4 21.2
26.38 32.6 42.75 46.7 51.10 59.43 61.95 119.3 126.5 139.2 188.91
687.2 848.0

NAME ______________________________

? ? MYSTERY HORSE ? ?

- Most experts consider him to be the greatest horse in American history.
- He was purchased at an auction for $5000 in 1918.
- He won 20 of the 21 races he entered.
- He earned about $2 million.



To find the mystery horse's name:

1. Circle the seven incorrect answers.
2. Use the letters written next to the incorrect answers to spell out the mystery horse's name.

1. 18.3 + 7.6 = 25.9 T
2. 49.4 + 81.7 = 131.1 S
3. 4.66 + 6.82 = 11.48 U
4. 5.78 + 13.5 = 7.095 M
5. 0.085 + 0.334 = 0.419 G
6. 8.327 + 9.295 = 17.622 E
7. 1.559 + 1.726 = 2.285 A
8. 1.664 + 1.353 = 3.017 T
9. 37.39 + 8.85 = 56.24 N
10. 43.47 + 9.32 = 52.79 T

11. 21.88 + 1.43 + 19.36 = 32.67 O
12. 16.57 + 3.25 + 6.13 = 25.95 L
13. 9.856 + 4.309 + 7.638 = 21.803 E
14. 4.115 + 1.679 + 3.141 = 8.935 S
15. 0.126 + 1.32 + 1.88 = 5.326 W
16. 1.6 + 1.338 + 1.19 = 4.128 K
17. 0.382 + 0.63 + 0.4 = 1.412 E
18. 145 + 0.7 + 5.62 = 19.765 A
19. 4.262 + 9.5 + 4.301 + 0.2 = 18.263 D
20. 29.031 + 6.93 + 0.056 + 3.7 = 45.26 R

Answer: ___ ___ ___   ___   ___ ___ ___

NAME ______________________________

Divide. Continue dividing until the remainder is zero.

1. $$\begin{array}{r} 20.3 \\ 0.34\overline{)6.902} \\ -68 \\ \hline 102 \\ -102 \\ \hline 0 \end{array}$$

Move the decimal point in the divisor and in the dividend to make the divisor a whole number. The decimal point in the quotient goes above the new decimal point.

2. $$\begin{array}{r} 60. \\ 0.07\overline{)4.20} \\ -42 \\ \hline 00 \end{array}$$

Write extra zeros, if necessary.

3. $0.7\overline{)0.28}$

4. $0.09\overline{)3.6}$

5. $0.006\overline{)5.4}$

6. $0.39\overline{)15.6}$

7. $6.3\overline{)0.945}$

8. $0.052\overline{)1.716}$

Divide. Round each quotient to the nearest tenth.

9. $8\overline{)3.75}$

10. $0.18\overline{)0.1248}$

11. $0.71\overline{)0.117}$

NAME ____________________

Add or subtract.

1. 236.07 + 1.7 + 41

Line up the
decimal points

$$\begin{array}{r} 236.07 \\ 1.7 \\ +\ 41 \\ \hline \end{array} \qquad \begin{array}{r} 236.07 \\ 1.70 \\ +\ 41.00 \\ \hline 278.77 \end{array}$$

2. $\begin{array}{r} 34.52 \\ -17.84 \\ \hline \end{array}$

3. $\begin{array}{r} 63.74 \\ +19.07 \\ \hline \end{array}$

4. $\begin{array}{r} 15.9 \\ +\ 8.5 \\ \hline \end{array}$

5. $\begin{array}{r} 75.28 \\ +\ 0.49 \\ \hline \end{array}$

6. $\begin{array}{r} 73.8 \\ -21.7 \\ \hline \end{array}$

7. $\begin{array}{r} 91.83 \\ -\ 7.05 \\ \hline \end{array}$

8. $\begin{array}{r} 617.46 \\ -209.58 \\ \hline \end{array}$

9. $\begin{array}{r} 17.867 \\ -\ 5.087 \\ \hline \end{array}$

10. $\begin{array}{r} 98.89 \\ +24.56 \\ \hline \end{array}$

11. $\begin{array}{r} 36.704 \\ +\ 9.836 \\ \hline \end{array}$

12. 49.08 + 5.27 ____________________

13. 8.9 − 5.3 ____________________

14. 15.9 + 8.02 + 13 ____________________

15. 64.2 − 17.953 ____________________

16. 25.16 + 9.7 + 19.831 ____________________

17. 5.07 − 1.594 ____________________

18. 9.705 + 5 + 18.59 ____________________

19. 24 − 8.35 ____________________

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 11

B. Topic: Decimals

C. Prerequisite: Decimal Operations

D. Purpose: Decimals and Fractions

E. Performance Objective: The student should be able to convert fractions to decimals and decimals to fractions and apply to mathematical calculations.

1. Activity:
    - a. Student will complete exercises 1-24 Unit 11.
    - b. Student will complete exercises 1-6 Unit 11 in solving word problems.
2. Conditions: Classroom
3. Standards: 80% on practice exercises

F. ______________________________

(Equipment, Materials, Resources Required)

Quantity	Item
-	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math   B. Lecture Number: XI

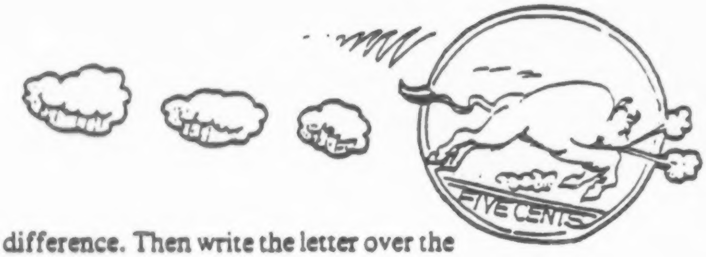
I. Decimals And Fractions

- A. Changing Decimals to Fractions
    1. Write the number without the decimal point as the numerator of a fraction
    2. The denominator of the fraction is the place value of the decimal digit on the right
    3. Reduce the fraction to lowest terms
- B. Changing Fractions to Decimals
    1. Divide the numerator by the denominator
    2. Set the decimal point in the problem
    3. Set decimal point in the answer directly above the decimal point in the problem
    4. Add zeros to make extra decimal places
    5. Divide
- C. Working with Money
    1. A fraction expresses a part of one unit
    2. Unit price of an item often stated as a decimal

NAME ____

FLIP IT OVER

This type of nickel is usually called a "buffalo" nickel. Whose portrait is on the other side?



Use a ruler to connect each exercise with its difference. Then write the letter over the exercise number in the DECODER to get the answer.

1. 69.9 − 5.9 •
2. 58.7 − 23.4 •
3. 23.2 − 6.8 •
4. 91.07 − 6.25 •
5. 31.25 − 3.18 •
6. 86.5 − 55.7 •
7. 74.4 − 9.8 •
8. 91.17 − 6.25 •
9. 0.46 − 0.33 •
10. 7.78 − 0.86 •
11. 226.5 − 53.5 •
12. 8.6 − 3.9 •
13. 456.9 − 369.5 •
14. 9.15 − 0.67 •
15. 0.29 − 0.23 •
16. 91.3 − 49.7 •

• Ⓜ 84.82
• Ⓐ 16.4
• Ⓒ 84.92
• Ⓘ 64.6
• Ⓐ 0.13
• Ⓐ 64
• Ⓡ 30.8
• Ⓓ 87.4
• Ⓝ 35.3
• Ⓔ 28.07
• Ⓘ 8.48
• Ⓘ 173
• Ⓝ 4.7
• Ⓝ 6.92
• Ⓝ 41.6
• Ⓐ 0.06

DECODER

A _   _ _ _ _ _ _ _ _
1 2   3 4 5 6 7 8 9 10

_ _ _ _ _ _
11 12 13 14 15 16

NAME ______________________________

FOOTBALL FACTS

Circle the letter of the greater number in each box to find some facts about the first professional football game.

Where was the first pro game played?

1. 0.6 N 0.7 L	2. 0.09 A 0.08 E	3. 0.006 W 0.007 T	4. 0.05 H 0.5 R	5. 14.06 A 14.6 O
6. 0.916 A 0.92 B	7. 43.86 N 43.87 E	8. 0.8 P 0.65 L	9. 56.3 E 5.63 O	10. 6.03 S 60.3 N
11. 14.02 A 14.2 N	12. 9.5 S 9.15 N	13. 0.8 G 0.9 Y	14. 3.11 E 3.14 L	15. 6.16 L 16.6 V
16. 7.3 A 3.7 E	17. 25.1 N 1.2 S	18. 38.07 C 38.08 I	19. 14.8 A 12.96 L	

Answer: _ _ _ _ _ _ _ , _ _ _ _ _ _ _ _ _ _ _ _

When was the game played?

20. 8.4 S 8.04 O	21. 2.09 C 2.9 E	22. 6.23 T 6.32 P	23. 92.54 T 92.504 O	24. 14.08 B 14.8 E
25. 7.3 M 7.03 E	26. 62.21 R 62.302 B	27. 14.41 E 14.401 F	28. 1.88 I 88.1 R	29. 6.3 T 3.6 R
30. 9.2 H 2.9 S	31. 3.02 T 3.04 I	32. 2.96 N 3.06 R	33. 0.008 I 0.8 D	34. 9.7 E 9.05 N
35. 16 E 17.1 I	36. 4.3 T 15 G	37. 86 H 8.6 E	38. 54.2 E 54.21 T	39. 9.8 E 9.08 N
40. 8.6 E 8.5 S	41. 0.6 N 0.05 I	42. 9.1 X 9.3 N	43. 86.2 I 8.2 T	44. 5.3 N 3.5 E
45. 6.01 T 6.02 E	46. 8.93 H 9.03 T	47. 6.1 R 6.21 Y	48. 3.4 F 3.09 E	49. 6.4 E 6.5 I
50. 8 O 8.2 V	51. 0.04 E 0.005 N			

Answer: _ _ _ _ _ _ _ _ _ _ _ _ _ _ ,

_ _ _ _ _ _ _ _ _ _ _ _ _ _ - _ _ _ _

Unit 11

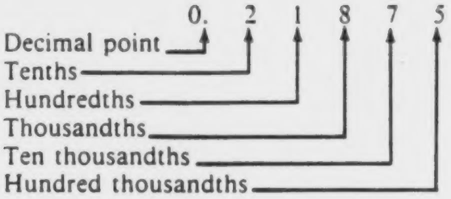
INTRODUCTION TO DECIMAL FRACTIONS

INTRODUCTION

As you have seen so far, numbers can be classified in a variety of ways, such as whole numbers, common fractions, mixed numbers, etc. This unit introduces another classification of numbers called decimal numbers.

In Unit One, it was noted that our numbering system is based on ten digits and that larger numbers are created by lining up these digits in a certain order. The decimal system uses this method of place position values to express numbers that are less than whole numbers. These are called **decimal fractions.**

All decimal numbers include a **decimal point.** Digits to the left of the decimal point are whole numbers. Digits to the right of the decimal point are fractional numbers. Each position to the right of the decimal has a value. Listed below are some of the names and place values.



There are two ways of expressing decimal fractions verbally:

1. Pronounce each digit individually;
   14.63;
   "Fourteen point (or decimal) six three."
2. Pronounce the decimal fraction as a whole number and add the name of the last place value;
   14.63;
   "Fourteen and sixty three hundredths."

Always include a zero to the left of the decimal point if there are no whole numbers in the units place.

CONVERTING DECIMAL FRACTIONS TO COMMON FRACTIONS

A decimal fraction is changed to a common fraction by using the last place value as the denominator and the decimal fraction digits as the numerator:

$$0.3 = \frac{3}{10}$$

$$0.27 = \frac{27}{100}$$

$$0.173 = \frac{173}{1000}$$

The task is simplified by the fact that denominators will always be multiples of 10, such as 10, 100, 1,000, 10,000 etc. The actual value depends upon the place position of the last digit. Once you have done the conversion, you should reduce the fraction, if possible.

$$0.0625 = \frac{625}{10000} = \frac{25}{400} = \frac{1}{16}$$

$$0.828125 = \frac{828125}{1000000} = \frac{33125}{40000} = \frac{53}{64}$$

CONVERTING COMMON FRACTIONS TO DECIMAL FRACTIONS

A common fraction is changed to a decimal fraction by dividing the numerator by the denominator:

$$\frac{3}{4} = 4\overline{)3\quad}$$

Place a decimal to the right of the dividend. Place another decimal directly above that decimal. This is done so the decimal in the answer (the quotient) is properly located:

$$\frac{3}{4} = 4\overline{)3.\quad}$$

Now, add a zero to the right of the decimal in the dividend and begin to divide. Add zeros to the dividend as needed:

$$\begin{array}{r} .75 \\ 4\overline{)3.00} \\ \underline{2\,8\checkmark} \\ 20 \\ \underline{20} \\ 0\ R \end{array}$$

ROUNDING DECIMALS

The previous example is typical of most fractions. However, there are two situations you should watch for and take special action. First, there are some common fractions which result in an unending decimal fraction. For example, 1/3 will convert to the unending decimal fraction 0.33333. Second, some common fractions will convert to decimal fractions that are quite long and much more accurate than the original common fraction. Therefore, it is common practice to reduce such numbers to a degree of accuracy that is adequate. This process is called **rounding the decimal** and is done as follows:

Determine the degree of accuracy required. Normally, the problem description will indicate the degree of accuracy required or to what place the decimal fraction should be extended. Also, the accuracy required is usually indicated as a tolerance on the shop drawings you will be using. An explanation of tolerance will be covered later in this text.

Eliminate all digits beyond the required degree of accuracy. If the first number you eliminate is 5 or more, increase the final number in your answer by 1. Following is an example:

1. Round 75.13846 to the nearest hundredth.

2. 75.13~~846~~.

3. Since 8, the first number eliminated, is greater than 5, increase the 3 to a 4.

4. The answer is 75.14.

KEY TERMS FOR WELDERS
DECIMAL FRACTION DECIMAL POINT ROUNDING THE DECIMAL

Unit 11—Practicing with Decimal Fractions

1. Write decimal numbers for the following:
   - (a) One hundred decimal zero one.
   - (b) Ninety five hundredths.
   - (c) Fourteen decimal zero zero one two five.
   - (d) Three thousand two hundred nineteen decimal one two five.
   - (e) Decimal seven zero seven.
   - (f) One thousand nine hundred seventeen ten thousandths.
   - (g) Decimal eight six six.
   - (h) Five decimal five one five six three.
2. Convert the following decimal fractions to common fractions:

(a) 0.35 (b) 0.28125

(c) 0.1665 (d) 0.6875

(e) 0.3333 (f) 0.78125

3. Convert the following to decimal fractions:

(a) $\frac{1}{2}$ (b) $10\frac{1}{10}$

(c) $\frac{1}{32}$ (d) $\frac{45}{64}$

(e) $\frac{7}{8}$ (f) $\frac{3}{1000}$

CONVERTING DECIMALS TO FRACTIONS

In Unit 11 you learned to convert decimals to fractions. A new situation arises when doing such a conversion for the purpose of linear measure. Here, you will have to convert the decimal dimension to one of the fractional dimensions normally found on your steel rule, such as eighths, sixteenths, thirty-seconds, or sixty-fourths. A typical example would be to convert 10.21 in. to a fractional dimension to the nearest sixty-fourth.

1. Dealing with the decimal part only, 0.21 converts to $\frac{21}{100}$.
2. Since 21/100 will not reduce exactly to a fraction with a denominator of 64, it will have to be reduced to the nearest sixty-fourth.
3. Begin this process by writing an equation like this:

$$\frac{21}{100} = \frac{x}{64}$$

Here's what this means. Since you want the final fraction to be in sixty-fourths, you know the denominator will be 64. However, you do not yet know what the numerator will be, so it is identified for now as "x."

4. The method for finding x can be expressed in one phrase: Cross multiply and divide.

   1. $\frac{21}{100} \searrow \frac{x}{64}$
   2. $21 \times 64 = 1344$
   3. $1344 \div 100 = 13\frac{11}{25}$

Remember, you are trying to find the number that will replace the x in the fraction x/64. That number as calculated so far would be 13 11/25. But, instead of using 13 11/25, round to the nearest whole number, which is 13. Thirteen, then, is the numerator.

5. The answer is $10\frac{13}{64}$ in. (to the nearest sixty-fourth).

SUMMARY OF CONVERSION FACTORS

FROM	TO	METHOD
Feet	Inches	Multiply by 12
Inches	Feet	Divide by 12
Inches	Millimeters	Multiply by 25.4
Millimeters	Inches	Divide by 25.4

TOLERANCE

Taking accurate measurements is obviously important to any tradesperson. But there is a limit to how accurately you can measure. This limit is determined by two main factors; the accuracy of the measuring tool and the accuracy of the surface of the material being measured. Because of this, dimensions on blueprints normally indicate a certain acceptable range that you are allowed to work within. This range is called the **tolerance** and it is usually indicated as shown in the follow-

DECIMAL EQUIVALENT TABLE

Fraction	Decimal	Fraction	Decimal	Fraction	Decimal	Fraction	Decimal
1/64	0.015 625	17/64	0.265 625	33/64	0.515 625	49/64	0.765 625
1/32	0.031 25	9/32	0.281 25	17/32	0.531 25	25/32	0.781 25
3/64	0.046 875	19/64	0.296 875	35/64	0.546 875	51/64	0.796 875
1/16	0.062 5	5/16	0.312 5	9/16	0.562 5	13/16	0.812 5
5/64	0.078 125	21/64	0.328 125	37/64	0.578 125	53/64	0.828 125
3/32	0.093 75	11/32	0.343 75	19/32	0.593 75	27/32	0.843 75
7/64	0.109 375	23/64	0.359 375	39/64	0.609 375	55/64	0.859 375
1/8	0.125	3/8	0.375	5/8	0.625	7/8	0.875
9/64	0.140 625	25/64	0.390 625	41/64	0.640 625	57/64	0.890 625
5/32	0.156 25	13/32	0.406 25	21/32	0.656 25	29/32	0.906 25
11/64	0.171 875	27/64	0.421 875	43/64	0.671 875	59/64	0.921 875
3/16	0.187 5	7/16	0.437 5	11/16	0.687 5	15/16	0.937 5
13/64	0.203 125	29/64	0.453 125	45/64	0.703 125	61/64	0.953 125
7/32	0.218 75	15/32	0.468 75	23/32	0.718 75	31/32	0.968 75
15/64	0.234 375	31/64	0.484 375	47/64	0.734 375	63/64	0.984 375
1/4	0.250	1/2	0.500	3/4	0.750	1	1.000

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 12

B. Topic: Percent

C. Prerequisite: Decimals and Fractions

D. Purpose: To Show Parts of a Whole

E. Performance Objective: The student will demonstrate the ability to show percents as parts of a whole.

1. Activity: a. The student will complete exercises 1-6 Unit 12 in solving word problems.

2. Conditions: Classroom

3. Standards: 80% on practice exercises

F. ______________________________

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XII

I. The Meaning Of Percent

- A. Percent
    - 1. Parts of a whole
    - 2. Whole divided into 100 parts
    - 3. Change percent to decimal or fraction
- B. Changing a Percent to a Decimal
    - 1. Drop the percent sign
    - 2. Move decimal point 2 places to the left
    - 3. Write a zero as a place holder where needed
- C. Changing a Decimal to a Percent
    - 1. Move decimal point 2 places to the right
    - 2. Omit decimal point at end of a whole number
    - 3. Zero place holder may be dropped
- D. Changing a Fraction or Mixed Number to a Percent
    - 1. Fraction
        - a. Multiply fraction by 100/1
        - b. Reduce and divide as needed
        - c. Write the percent sign
    - 2. Mixed number
        - a. Multiply the whole number by 100 and write the percent sign
        - b. Change the fraction to a percent
        - c. Add the two percents
- E. Changing a Percent to a Fraction or Mixed Number
    - 1. Drop the percent sign and write the number with a denominator of 100
    - 2. Reduce the fraction if necessary
- F. Solving Word Problems
    - 1. Using mental math
        - a. Memorize common percent/fraction equivalents
        - b. Use either decimal or fraction
    - 2. Hints
        - a. Fractions are easier to use when the percent has a fraction part (33 1/3).
        - b. When the numerator of the fraction is greater than 1 (such as 3/4), use whichever method seems easier.

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 13

B. Topic: Percent (Part I)

C. Prerequisite: Parts of a Whole

D. Purpose: Solving Percent Problems

E. Performance Objective: The student should be able to demonstrate the ability to do percent problems.

1. Activity:
   - a. The student should be able to complete exercises 1-44 Unit 13.
   - b. The student should be able to complete exercises 1-6 Unit 13 in word problems.
2. Conditions: Classroom
3. Standards: 80% on practice exercises

F. ______________________________

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math

B. Lecture Number: XII

I. Solving Percent Problems (Part I)

- A. Three Basic Parts
  - 1. Base
  - 2. Part
  - 3. Rate
  - 4. Base x rate = part
  - 5. Rate always followed by % sign
- B. Finding the Part
  - 1. Whole amount
  - 2. Rate
    - a. Convert rate to decimal
    - b. Multiply
  - 3. Part
- C. Finding Percent of Increase or Decrease
  - 1. Subtract original amount from the new amount
  - 2. Divide the difference by the original amount
  - 3. Convert the decimal to a percent
- D. Solving Word Problems
  - 1. Using mental math
  - 2. Move decimal point

NAME ________________________________

Write as a percent.

1. 24 out of 60 40%

Write as a fraction. $\frac{24}{60}$

Divide to hundredths.

$$\begin{array}{r} 0.40 \\ 60\overline{)24.00} \\ -\underline{24\,0} \\ 00 \\ -\underline{00} \end{array}$$

0.40 = 40%

2. 3 out of 6 ____

3. 12 out of 30 ____

4. 15 out of 50 ____

5. 36 out of 80 ____

6. 44 out of 80 ____

Find the missing percent.

7. 9 is 25 % of 36.

Write as a fraction. $\frac{9}{36}$

Divide.

$$\begin{array}{r} 0.25 \\ 36\overline{)9.00} \\ -\underline{7\,2} \\ 1\,80 \\ -\underline{1\,80} \end{array}$$

0.25 = 25%

8. 5 is ____ % of 10.

9. 52 is ____ % of 80.

10. 6 is ____ % of 8.

11. 36 is ____ % of 90.

12. 42 is ____ % of 70.

NAME ______________________________

Use the table. Find the percent of each number.

Percent	Fraction
10%	$\frac{1}{10}$
20%	$\frac{1}{5}$
25%	$\frac{1}{4}$
40%	$\frac{2}{5}$
50%	$\frac{1}{2}$
60%	$\frac{3}{5}$
75%	$\frac{3}{4}$
80%	$\frac{4}{5}$

1. 20% of 70 ___14___

$20\% = \boxed{\frac{1}{5}}$

$\boxed{\frac{1}{5}} \times 70 = \boxed{14}$

2. 50% of 64 ___32___

$50\% = \boxed{\frac{1}{2}}$

$\boxed{\frac{1}{2}} \times 64 = \boxed{32}$

3. 10% of 30 ________

$10\% = \boxed{}$

$\boxed{} \times 30 = \boxed{}$

4. 75% of 12 ________

$75\% = \boxed{}$

$\boxed{} \times 12 = \boxed{}$

5. 25% of 48 ________

What instrument has 44 keys but plays no music?

Find the percent of each number. Then find your answer below.
Write the letter for that answer. Two answers are used twice.

6. 45% of 40 ___18___ I

$45\% = \frac{\boxed{45}}{100} = \boxed{\frac{9}{20}}$

$\boxed{\frac{9}{20}} \times 40 = \boxed{18}$

Write 45% as a fraction and simplify. Then multiply.

7. 6% of 50 ________ W

$6\% = \frac{\boxed{}}{100} = \boxed{}$

$\boxed{} \times 50 = \boxed{}$

9. 85% of 40 ________ P

10. 41% of 300 ________ Y

11. 24% of 50 ________ T

12. 1% of 200 ________ R

13. 68% of 25 ________ T

14. 56% of 50 ________ E

						I			
17	123	34	28	3	2	18	12	28	2

NAME ______________________

Find each answer. Each time an answer is given in the code, write the letter for that exercise. You will find the name for a skinny vegetable. Two answers are used twice.

1. 175% of 500 875 **N**

175% of 500 is ___.

1.75 (500) = n

875 = n

2. 18% of 300 ____ **R**

3. 25% of 240 ____ **G**

4. 75% of 64 48 **A**

75% of 64 is ___.

$\frac{3}{4}(64) = n$

48 = n

5. 30% of 210 ____ **N**

6. 15% of 300 ____ **E**

7. 6% of 200 ____ **A**

8. 260% of 25 ____ **E**

9. 90% of 170 ____ **L**

10. 0.5% of 72 ____ **N**

11. 2.8% of 90 ____ **A**

12. 0.07% of 56 ____ **B**

			A						N				
12	153	65	48	0.36	60	54	65	45	875	0.0392	45	2.52	63

NAME ____________________

Find each answer. Use a decimal for each percent.

1. 96 is 80% of what number? 120

80% of ___ is 96.

$0.8n = 96$

$\frac{0.8n}{0.8} = \frac{96}{0.8}$

$n = 120$

Divide by 0.8 to get *n* by itself.

2. 80% of what number is 44? ______

3. 56 is 28% of what number? ______

4. 26 is 65% of what number? ______

5. 15% of what number is 60? ______

6. 79% of what number is 79? ______

Find each answer. Use a fraction for each percent.

7. $66\frac{2}{3}\%$ of what number is 50? ______

8. $12\frac{1}{2}\%$ of what number is 15? ______

9. $33\frac{1}{3}\%$ of what number is 25? ______

10. 30 is $37\frac{1}{2}\%$ of what number? ______

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 14

B. Topic: Percents (Part II)

C. Prerequisite: Percents Part I

D. Purpose: Solving Interest Problems

E. Performance Objective: The student should be able to compute principal and interest.

1. Activity:
    a. The student will complete exercises 1-40 Unit 14.
    b. The student will complete exercises 1-6 in word problems.
    c. The student will complete a quiz.
    d. The student will review arithmetic.

2. Conditions: Classroom

3. Standards: 80% on practice exercises and quiz

F. ______________________________
(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XIV

I. Solving Percent Problems (Part II)

- A. Finding the Base
  - 1. $\frac{\text{Part}}{\text{Rate}}$ = Base
  - 2. Part may be greater than base
- B. Solving Interest Problems
  - 1. Interest
    - a. I = interest
    - b. p = principal
    - c. r = interest rate
    - d. t = time of loan
  - 2. Part = base x rate
  - 3. Simple Interest
    - a. Write the rate as a decimal or a fraction
    - b. Write the time in terms of years
    - c. Multiply: principal x rate x time = interest
  - 4. Amount paid back
    - a. Add principal and interest
    - b. p x r x t = interest
- C. Solving Word Problems
  - 1. Organize the information
  - 2. Decide information needed to solve problem
  - 3. Break problem down into steps

NAME ____________________

Solve each proportion.

1. $\frac{n}{6} = \frac{49}{42}$ ____n = 7____

$n \times 42 = 6 \times 49$

$42n = 294$

$\frac{42n}{42} = \frac{294}{42}$

$n = 7$

2. $\frac{r}{4} = \frac{81}{36}$ ____________

3. $\frac{7}{y} = \frac{56}{72}$ ____________

4. $\frac{a}{7} = \frac{18}{42}$ ____________

5. $\frac{b}{3} = \frac{24}{18}$ ____________

6. $\frac{c}{16} = \frac{3}{8}$ ____________

7. $\frac{7}{x} = \frac{1}{10}$ ____________

8. $\frac{9}{n} = \frac{3}{14}$ ____________

9. $\frac{42}{m} = \frac{6}{5}$ ____________

10. $\frac{24}{56} = \frac{d}{7}$ ____________

11. $\frac{32}{72} = \frac{16}{e}$ ____________

12. $\frac{56}{24} = \frac{f}{48}$ ____________

NAME

Complete each exercise to show equal ratios.

1. $\frac{18}{3} = \frac{18 \times 2}{3 \times 2} = \frac{36}{\boxed{6}}$

$18 \times 2 = 36$

$3 \times 2 = 6$

$\frac{18}{3} = \frac{36}{6}$

Multiply both 18 and 3 by the same number, 2.

2. $\frac{18}{3} = \frac{18 \div 3}{3 \div 3} = \frac{\square}{\square}$

3. $\frac{11}{5} = \frac{11 \times 3}{5 \times 3} = \frac{\square}{\square}$

4. $\frac{14}{8} = \frac{14 \div 2}{8 \div 2} = \frac{\square}{\square}$

5. $\frac{21}{14} = \frac{21 \div \square}{14 \div \square} = \frac{\square}{2}$

6. $\frac{7}{1} = \frac{7 \times 5}{1 \times \square} = \frac{\square}{\square}$

7. $\frac{35}{75} = \frac{\square \div 5}{\square \div 5} = \frac{\square}{\square}$

8. $\frac{36}{45} = \frac{36 \div \square}{\square \div 9} = \frac{\square}{\square}$

Shade in each shape where the ratios form a proportion. You will find the name of the 38th President.

$\frac{6}{9}$ $\frac{30}{45}$

6×45 9×30

270 270

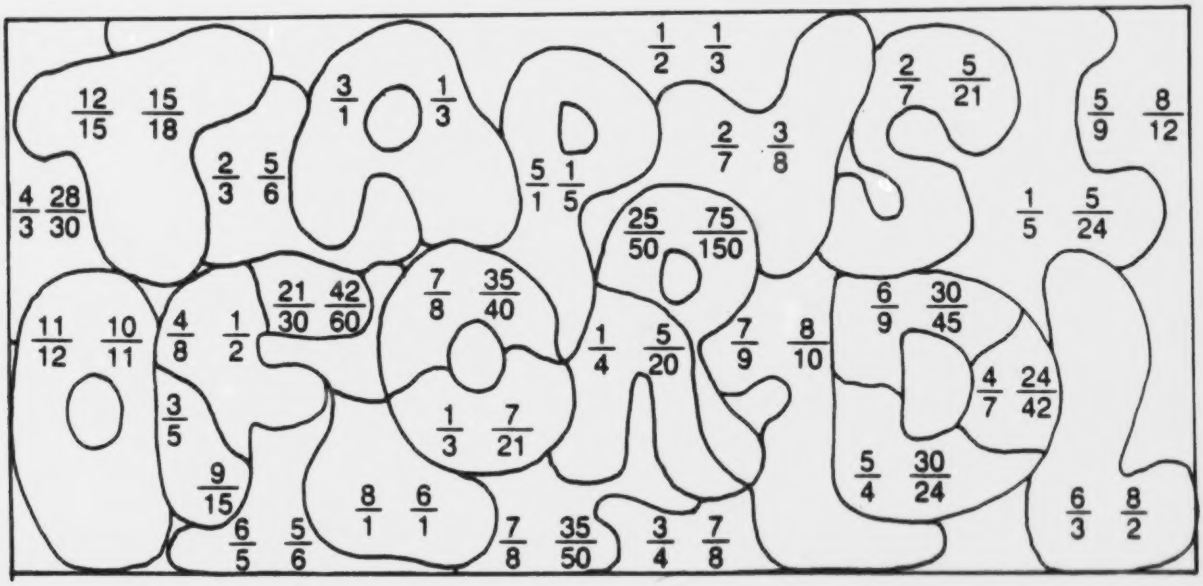
Since the cross-products are equal, the ratios do form a proportion. Shade in the area.

$\frac{5}{9}$ $\frac{8}{12}$

5×12 9×8

60 72

The cross-products are *NOT* equal. Do not shade in.


12/15 15/18
4/3 28/30
2/3 5/6
3/1 1/3
1/2 1/3
5/1 1/5
2/7 3/8
2/7 5/21
5/9 8/12
1/5 5/24
25/50 75/150
11/12 10/11
4/8 1/2
21/30 42/60
7/8 35/40
1/4 5/20
7/9 8/10
6/9 30/45
4/7 24/42
3/5
9/15
1/3 7/21
5/4 30/24
8/1 6/1
6/5 5/6
7/8 35/50
3/4 7/8
6/3 8/2

NAME ______________________________

Mr. Corbin will choose 2 students at random from the debate team to attend a speech workshop.

The name of each student is written on a card. Mr. Corbin will draw a card to select the first student. Then, without replacing the first card, he will draw a second card to select the second student.

Complete the table. Then use the table to help answer the exercises.

Number of Students on the Team

	Seventh graders	Eighth graders	Totals
Boys	7	8	1.
Girls	4	16	2.
Totals	3.	4.	5.

How many students will Mr. Corbin have to choose from on

6. the first draw? ______________

7. the second draw? ______________

8. How many possible outcomes are there on two draws?

____

possible outcomes = number of choices for the first student × number of choices for the second student

9. Suppose Mr. Corbin can send only seventh graders. How many possible outcomes are there on two draws? ______________

Suppose Mr. Corbin can send only eighth graders. Find the probability that both students will be girls.

10. Find the number of possible outcomes.

____

11. Find the number of favorable outcomes.

____

favorable outcomes = number of eighth-grade girls × number of eighth-grade girls remaining after one is chosen

12. What is the probability that both students chosen will be eighth-grade girls?

____

probability = $\frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$

NAME ______________________________

The table shows the number of students in a gymnastics competition. The order in which the students will compete is set by selecting each of the 30 gymnasts at random. Use the information in the table to help you answer the exercises.

Gymnastics Competition

	Seventh graders	Eighth graders	Totals
Girls	2	12	14
Boys	6	10	16
Totals	8	22	30

Find the probability that

1. the first two gymnasts selected are girls. $\frac{91}{435}$

On the first draw, there are 14 favorable outcomes and 30 possible outcomes.

If a girl is chosen on the first draw, 13 girls remain out of 29 gymnasts

$$\frac{14}{30} \times \frac{13}{29} = \frac{7}{5} \times \frac{13}{29} = \frac{91}{435}$$

2. the first two gymnasts selected are boys. ______________

3. the first two gymnasts selected are seventh grade girls. ______________

4. the first two gymnasts selected are eighth-grade boys. ______________

5. the first gymnast selected is a seventh-grade boy and the second one is an eighth-grade boy. $\frac{2}{29}$

$$\frac{6}{30} \times \frac{10}{29} = \frac{1}{\cancel{5}} \times \frac{\overset{2}{\cancel{10}}}{29} = \frac{2}{29}$$

6. the first two gymnasts selected are boys and the next two gymnasts selected are girls. ______________

7. the first gymnast selected is a girl and the next three gymnasts selected are boys. ______________

8. the first four gymnasts selected will be eighth-grade boys. ______________

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 15

B. Topic: Ratio and Proportion, Mean, Median, and Probability

C. Prerequisite: Arithmetic

D. Purpose: Comparison of Numbers

E. Performance Objective: The student should be able to demonstrate ability to solve problems accurately using ratio, proportion, mean, median, and probability.

1. Activity:
    a. The student will complete exercises 1-38 Unit 15.
    b. The student will complete exercises 1-8 Unit 15 in word problems.
2. Conditions: Classroom
3. Standards: 80% on practice exercises

F. ____

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: 15

I. Ratio And Proportion, Mean, Median, And Probability

- A. Ratio
    - 1. Comparison of two numbers
    - 2. Two equal ratios
- B. Proportion
    - 1. When two ratios are written as equal ratios
    - 2. Ratios often used to express rate
- C. Mean and Median
    - 1. Data
    - 2. Mean -- average
    - 3. Median -- middle number
    - 4. Range -- highest to lowest
- D. Probability
    - 1. Total number of possible results
    - 2. Number of favorable results
    - 3. To find the probability $p = \frac{\text{number of favorable results}}{\text{total number of possible results}}$
    - 4. Probability expressed three ways
        - a. As a ratio
        - b. As a fraction
        - c. As a decimal
- E. Solving Word Problems
    - 1. Use proportions
    - 2. Percents are ratios
    - 3. To find the missing number in the proportion, cross multiply and divide by the third number: $\frac{\text{part}}{\text{base}} = \frac{\text{rate}}{100}$
    - 4. To solve percent of increase or decrease problems, set up the proportion as follows: $\frac{\text{difference between the amounts}}{\text{original amount}} = \frac{\text{rate}}{100}$

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 16

B. Topic: Measurement

C. Prerequisite: Ratio and Proportion

D. Purpose: Systems

E. Performance Objective: The student should be able to identify and use standard and metric measurements.

1. Activity:
   a. The student will complete exercises 1-26 Unit 16.
   b. The student will complete exercises 1-6 Unit 16 in word problems.
2. Conditions: Classroom
3. Standards: 80% on practice exercises

F. ______________________________
(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XVI

I. Measurement Systems

- A. The Standard System
  - 1. Used in the United States
  - 2. Standard Measurement Chart
    - a. Length
    - b. Weight
    - c. Volume
    - d. Time
- B. Converting Measurements
  - 1. What units
  - 2. Ratios
  - 3. Remainders
- C. Operations with Measurements
  - 1. All measurements must be in the same units
  - 2. Smaller units are fractions of larger units
  - 3. You can multiply and divide measurements
- D. The Metric System
  - 1. Length - meter
  - 2. Weight or mass - gram
  - 3. Volume - liter
  - 4. Metric chart
- E. Operations
  - 1. Metric system based on powers of ten
  - 2. Conversion chart
  - 3. Use as decimals
- F. Solving Word Problems
  - 1. Use mental math
  - 2. Use rounding as with decimals

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 17

B. Topic: Perimeter, Circumference, and Area

C. Prerequisite: Metric System, Measurement

D. Purpose: Mathematical Calculations

E. Performance Objective: The student should be able to perform mathematical calculations on perimeter, area, and circumference.

1. Activity:
   a. The student will complete exercises 1-26 Unit 17.
   b. The student will complete a quiz.

2. Conditions: Classroom

3. Standards: 80% on practice exercises

F. ______________________________

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

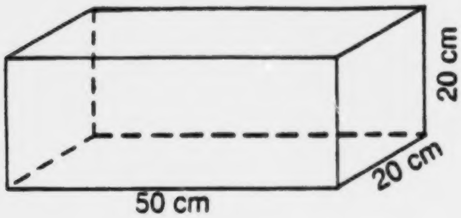
A. Course Title: WPL Math B. Lecture Number: XVII

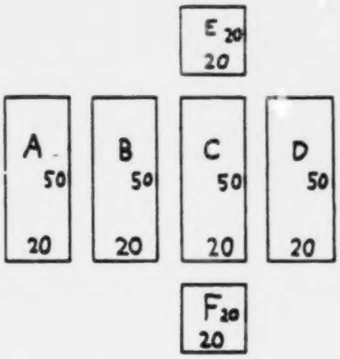
I. Perimeter, Circumference, And Area

- A. Perimeter
  - 1. Add the length of the sides
  - 2. Rectangle
    - a. Four square corners
    - b. P = Perimeter
    - c. P = 2L + 2W
  - 3. Square
    - a. Four equal sides
    - b. P = 4s
  - 4. Triangle
    - a. Three sides
    - b. p = a + b + c
  - 5. Parallelograms
    - a. a = bh
    - b. Height
    - c. Base
  - 6. Circles
    - a. A = area
    - b. br = radius
    - c. a = pi r squared
- B. Circumference
  - 1. Diameter
  - 2. Radius
  - 3. $C = \pi d$
- C. Area
  - 1. Measured in square units
  - 2. Area = l x w

Find the total surface area of each prism.

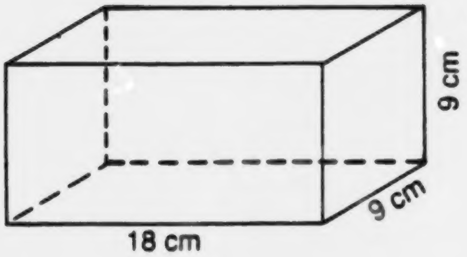
1.


20 cm
20 cm
50 cm

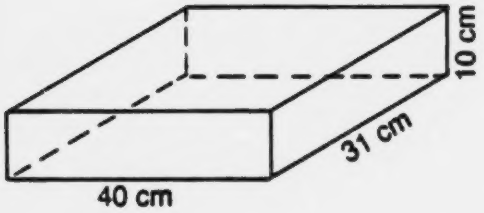

E 20
20
A 50
20
B 50
20
C 50
20
D 50
20
F 20
20

Face		Area of face (cm²)
A	20 × 50 =	1000
B	20 × 50 =	1000
C	20 × 50 =	1000
D	20 × 50 =	1000
E	20 × 20 =	400
F	20 × 20 =	400
	Total	4800 cm²

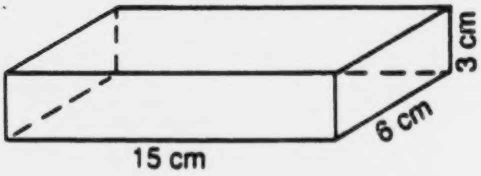
2. ______


9 cm
9 cm
18 cm

3. ______


10 cm
31 cm
40 cm

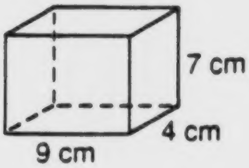
4. ______


3 cm
6 cm
15 cm

NAME ____

Find the volume of each prism.

1.

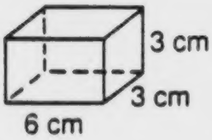


$V = l \times w \times h$

$V = 9 \times 4 \times 7$

$V = 252\ cm^3$

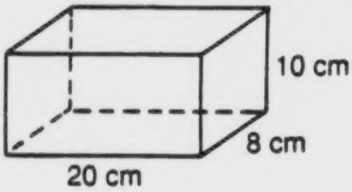
2. $54\ cm^3$



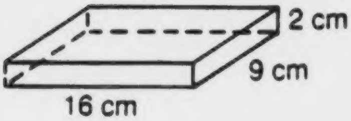
$V = 6 \times \boxed{3} \times \boxed{3}$

$V = \boxed{54}\ cm^3$

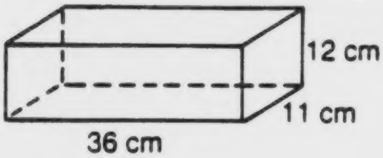
3. ____________


10 cm
8 cm
20 cm

4. ____________


2 cm
9 cm
16 cm

5. ____________


12 cm
11 cm
36 cm

6. Length 15 cm Width 7 cm Height 30 cm ____________

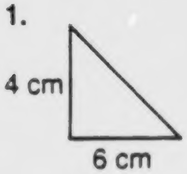
7. Length 2.3 cm Width 0.3 cm Height 5.2 cm ____________

8. Length 36 cm Width 8 cm Height 8 cm ____________

9. Length 50 cm Width 16 cm Height 24 cm ____________

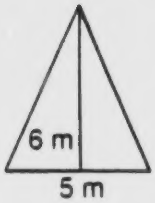
NAME ____________________

Find the area of each triangle.

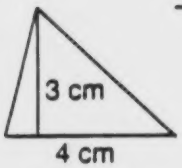
1. 

12cm²

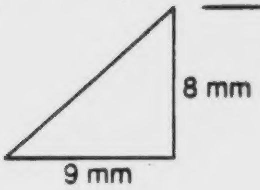
$A = (b \times h) \div 2$
$A = (6 \times 4) \div 2$
$A = 24 \div 2$
$A = 12\ \text{cm}^2$

2. 

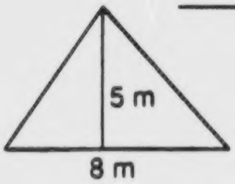
______

3. 

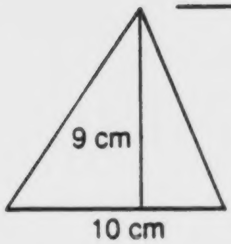
______

4. 

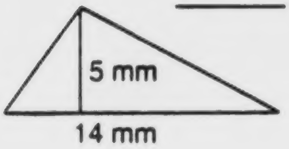
______

5. 

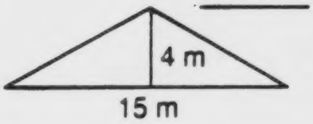
______

6. 

______

7. 

______

8. 

______

9. Base 4 cm
Height 7 cm ______

10. Base 11 cm
Height 8 cm ______

11. Base 20 cm
Height 9 cm ______

12. Base 12 cm
Height 9 cm ______

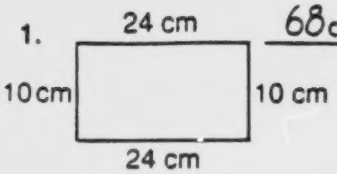
13. Base 7 cm
Height 16 cm ______

14. Base 32 cm
Height 3 cm ______

NAME ________________

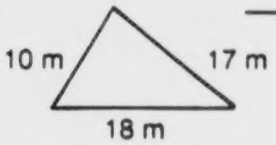
Find each perimeter.

1. 68cm

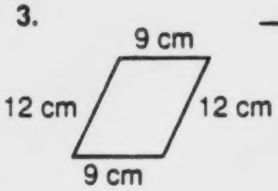

24 cm
10cm
10 cm
24 cm

24
10
24
+ 10
68

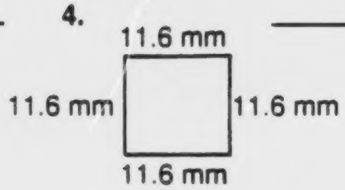
2. ______



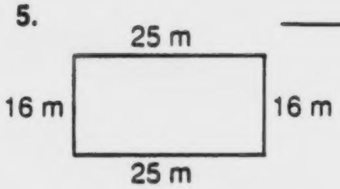
3. ______


9 cm
12 cm
12 cm
9 cm

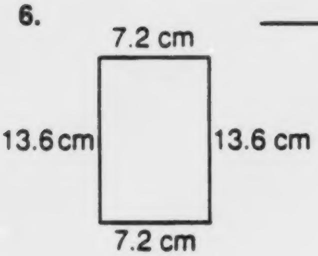
4. ______


11.6 mm
11.6 mm
11.6 mm
11.6 mm

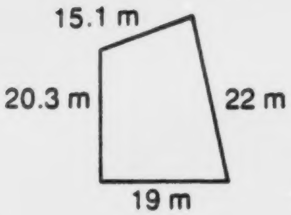
5. ______


25 m
16 m
16 m
25 m

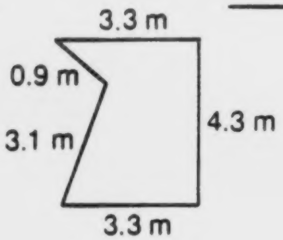
6. ______


7.2 cm
13.6cm
13.6 cm
7.2 cm

7. ______


15.1 m
20.3 m
22 m
19 m

8. ______


3.3 m
0.9 m
3.1 m
4.3 m
3.3 m

Find the perimeter of each figure whose sides are given.

9. 37 cm, 25 cm, 48 cm ______

10. 96 m, 72 m, 31 m, 46 m ______

11. 4 sides, each 9 mm ______

12. 3 sides, each 21 m ______

LESSON PLAN

A. Course Title: WPL Math   B. Plan Number: 18

B. Topic: Graphs, Charts, and Tables

C. Prerequisite: Perimeter, Circumference, and Area

D. Purpose: Graphs, Charts, and Tables

E. Performance Objective: The student should be able to apply the use of graphs, charts, and tables to organize information

1. Activity:
    a. The student will practice exercises 1-16 Unit 18.
    b. The student will practice exercises 1-4 in word problems.
    c. The student will complete a quiz.
    d. The student will review measurements.

2. Conditions: Classroom

3. Standards: 80% on practice exercises and quiz

F. ________________________________
(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

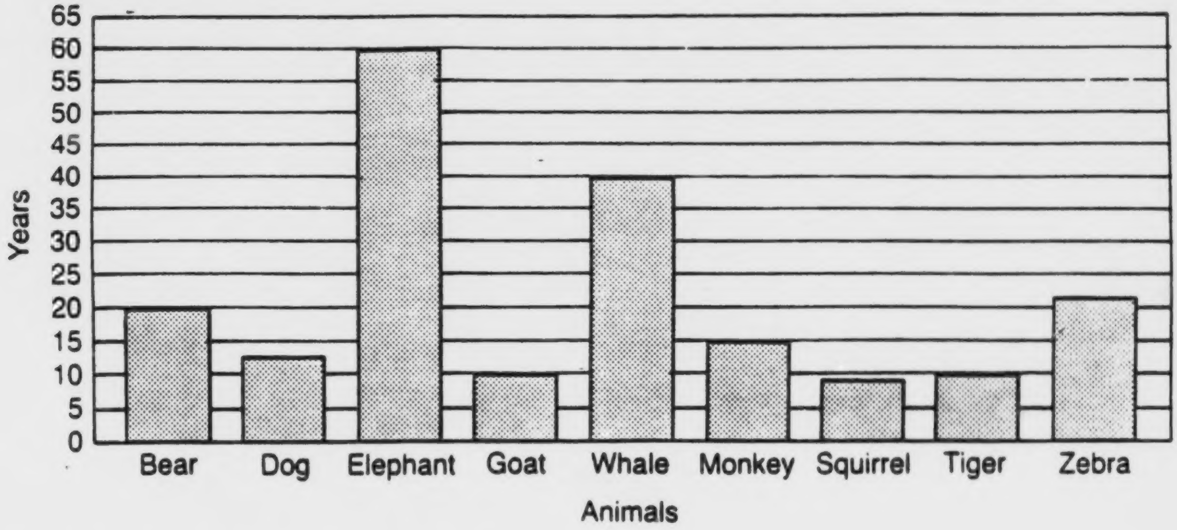
LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XVIII

I. Graphs, Charts, And Tables

- A. Graphs
  - 1. Compare data
  - 2. Show change
  - 3. Make predictions
- B. Parts of a Graph
  - 1. Title
  - 2. Axis lines and scales
    - a. Horizontal axis
    - b. Vertical axis
    - c. Key
- C. Types of Graphs
  - 1. Circle
  - 2. Line
  - 3. Bar
- D. Tables and Charts
  - 1. Group data in similar categories
  - 2. Tables show numbers
- E. Solving Word Problems
  - 1. Organize information
  - 2. Make a table of possibilities

NAME ______________________________



Lifespan of Animals

About how long does each animal live?

1. Bear ____________ 2. Whale ____________ 3. Monkey ____________

4. Goat ____________ 5. Elephant ____________ 6. Tiger ____________

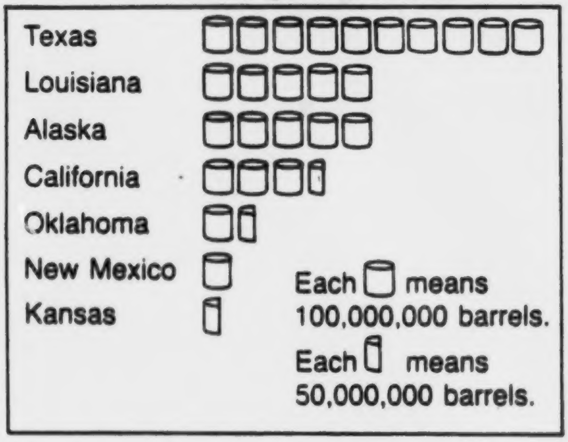
7. Which animal lives the longest? ______________________________

Which animal lives longer

8. the whale or the monkey? 9. the tiger or the squirrel?

______________________________ ______________________________

Oil-Producing States, 1979



Which state produced about this many barrels of oil:

10. 50,000,000? ____________

11. 150,000,000? ____________

12. 350,000,000? ____________

Circle the name of the state that produced more oil.

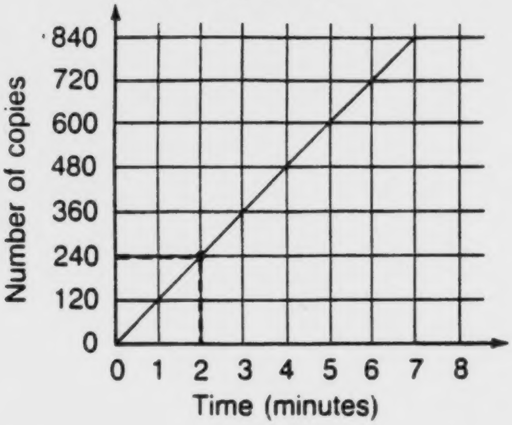
13. California or Oklahoma

14. New Mexico or Kansas

NAME ______________________________

Use the graphs to complete each exercise.

Copy-Making Time



Tell how many copies the machine can make in

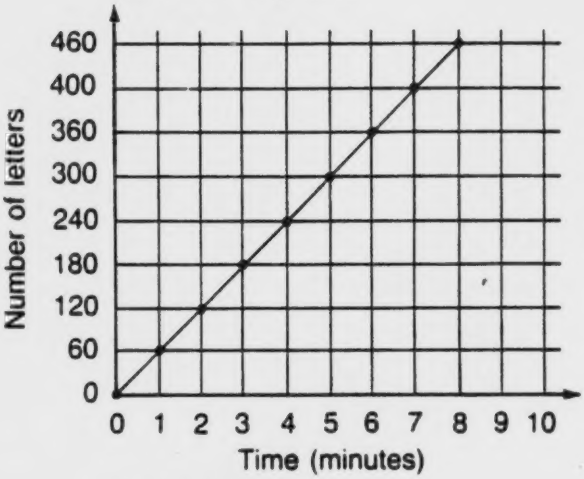
1. 2 minutes. 240

2. 3 minutes. ____________

3. 6 minutes. ____________

4. Tell how many minutes it takes the machine to make 480 copies. ____________

Letter-Printing Time



Tell how many letters the printer can do in

5. 4 seconds. ____________

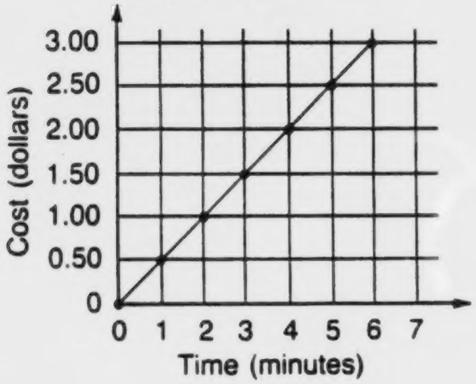
6. 8 seconds. ____________

Tell how many seconds it takes the printer to do

7. 360 letters. ____________

8. 120 letters. ____________

Telephone Cost



Find the cost of talking on the telephone for

9. 5 minutes. ____________

10. 2 minutes. ____________

11. 6 minutes. ____________

12. 3 minutes. ____________

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 19

B. Topic: Algebra

C. Prerequisite: Arithmetic

D. Purpose: Basic Concepts of Algebra

E. Performance Objective: The student should be able to apply basic algebraic function to signed numbers and algebraic expression.

1. Activity:
    - a. The student will practice exercises 1-50 Unit 19.
    - b. The student will complete exercises 1-22 Unit 19 in algebraic expression.
2. Conditions: Classroom
3. Standards: 80% on practice exercises

F. ______________________________

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XIX

I. Albegra

- A. Terms and Definitions
  - 1. Variable
  - 2. Algebraic expression
  - 3. Equation
  - 4. Formula
  - 5. Solving an equation
  - 6. Inequality
  - 7. Powers
  - 8. Root
- B. Signed Numbers -- Algebraic Expressions
  - 1. Integers
  - 2. Signed numbers
    - a. Quantity
    - b. Distance
    - c. Direction
  - 3. Positive numbers
  - 4. Negative numbers
  - 5. Number line
- C. Addition
  - 1. To add two integers with like signs
    - a. Add the absolute value
    - b. Keep the same sign
  - 2. To add two integers with unlike signs
    - a. Subtract the absolute value of the lesser integer from the absolute value of the greater
    - b. Keep the sign of the integer with the greater absolute value
- D. Subtraction
  - 1. Change the subtraction operation to addition
  - 2. Change the sign of the number to be subtracted
  - 3. Complete the problem as addition
- E. Multiplication and Division of Integers
  - 1. If the signs are the same, the answer is positive
  - 2. If the signs are different, the answer is negative
  - 3. Positive numbers can be written without the plus sign
  - 4. Negative numbers always use the minus sign
- F. Order of Operations
  - 1. If there are parentheses, do all work in them first in order: multiply, divide, add, subtract
  - 2. Then, multiply and divide in order from left to right through the expression
  - 3. Add and subtract through the expression from left to right
- G. Algebraic Expression
  - 1. A group of numbers, operation signs, and variables
  - 2. Always contain variables
  - 3. Simplifying an expression
  - 4. Add and subtract like terms

NAME ____________________

Give the opposite of each integer.

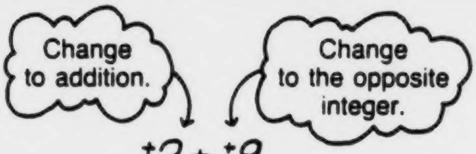
1. $^{-}5$ $^{+}5$ 2. $^{+}10$ $^{-}10$ 3. $^{-}24$ ______ 4. $^{-}19$ ______

5. $^{+}3$ ______ 6. $^{+}12$ ______ 7. $^{-}8$ ______ 8. $^{-}1$ ______

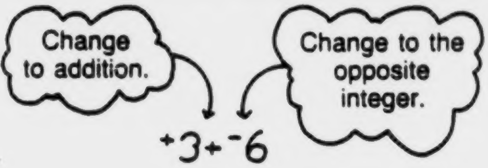
Change each subtraction problem to an addition problem.

9. $^{+}2 - {}^{-}9$ $^{+}2 + {}^{+}9$

10. $^{+}3 - {}^{+}6$ ______


Change to addition.
Change to the opposite integer.

$^{+}2 + {}^{+}9$

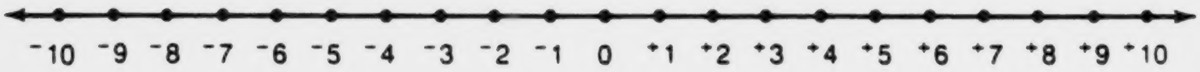

Change to addition.
Change to the opposite integer.

$^{+}3 + {}^{-}6$

11. $^{-}3 - {}^{-}10$ ______ 12. $^{-}8 - {}^{-}9$ ______ 13. $^{-}12 - {}^{+}20$ ______

14. $^{-}5 - {}^{+}14$ ______ 15. $^{+}3 - {}^{-}7$ ______ 16. $^{+}5 - {}^{+}11$ ______

Find each difference.


⁻10 ⁻9 ⁻8 ⁻7 ⁻6 ⁻5 ⁻4 ⁻3 ⁻2 ⁻1 0 ⁺1 ⁺2 ⁺3 ⁺4 ⁺5 ⁺6 ⁺7 ⁺8 ⁺9 ⁺10

17. $^{-}6 - {}^{+}2$ ______ 18. $^{-}7 - {}^{-}5$ ______ 19. $^{-}3 - {}^{-}8$ ______

$^{-}6 + {}^{-}2$

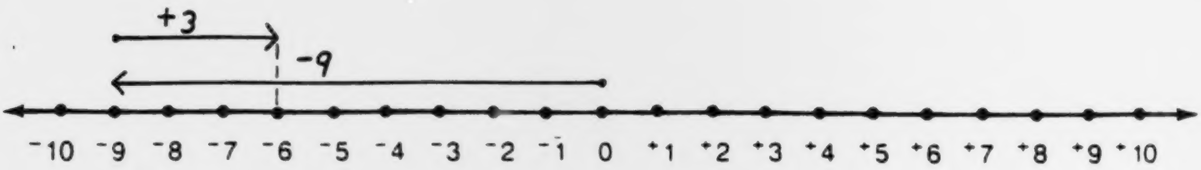
20. $^{+}3 - {}^{+}6$ ______ 21. $^{+}1 - {}^{-}6$ ______ 22. $^{+}2 - {}^{-}5$ ______

23. $^{-}8 - {}^{-}7$ ______ 24. $^{-}4 - {}^{+}4$ ______ 25. $^{-}2 - {}^{+}1$ ______

26. $^{-}4 - {}^{+}2$ ______ 27. $^{+}6 - {}^{+}5$ ______ 28. $^{+}11 - {}^{-}4$ ______

NAME ______________________________

Find $^{-}9 + ^{+}3$. Use the number line.


+3
-9
⁻10 ⁻9 ⁻8 ⁻7 ⁻6 ⁻5 ⁻4 ⁻3 ⁻2 ⁻1 0 ⁺1 ⁺2 ⁺3 ⁺4 ⁺5 ⁺6 ⁺7 ⁺8 ⁺9 ⁺10

$^{-}9 + ^{+}3 = ^{-}6$

Find each sum.

1. $^{+}6 + ^{-}4$ $^{+}2$

2. $^{+}9 + ^{-}2$ $^{+}7$

3. $^{-}5 + ^{+}1$ ______

4. $^{+}8 + ^{-}10$ ______

5. $^{-}4 + ^{+}7$ ______

6. $^{+}5 + ^{-}5$ ______

7. $^{+}5 + ^{-}3$ ______

8. $^{-}3 + ^{+}8$ ______

9. $^{+}2 + ^{-}10$ ______

10. $^{-}7 + ^{+}2$ ______

11. $^{+}9 + ^{-}7$ ______

12. $^{-}5 + ^{+}9$ ______

13. $^{+}2 + ^{+}3$ ______

14. $^{-}8 + ^{+}13$ ______

15. $^{-}9 + ^{+}2$ ______

16. $^{-}8 + ^{-}3$ ______

17. $^{-}6 + ^{-}6$ ______

18. $^{-}4 + ^{+}7$ ______

19. $^{+}9 + ^{+}3$ ______

20. $^{-}8 + ^{-}2$ ______

21. $^{+}10 + ^{-}8$ ______

22. $^{-}6 + ^{-}2$ ______

23. $^{-}5 + ^{+}4$ ______

24. $^{+}5 + ^{-}7$ ______

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 20

B. Topic: Equations

C. Prerequisite: Signed Numbers

D. Purpose: To Find a Number That Makes a True Statement

E. Performance Objective: The student should be able to use equations to solve problems.

1. Activity:
   a. The student will practice exercises 1-42 Unit 20.
   b. The student will practice exercises 1-14 Unit 20 in solving word problems.

2. Conditions: Classroom

3. Standards: 80% on practice exercises

F. ______________________________
(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XX

I. Equations

- A. A Mathematical Statement That Two Quantities are Equal
- B. One-step Equations
  1. Isolating the variables
  2. Inverse
- C. Two-step Equations
  1. Reverse normal order of operations
  2. Perform the inverse operations for addition and subtraction first
  3. Perform multiplication and division operations second
- D. Isolate the Variables on One Side of the Equation
- E. Multiply Each Number by the Multiplier to Remove Parentheses
- F. Use X to Represent the Unknown Number
- G. Combine Like Terms
- H. Solving Word Problems
  1. Identify the unknown amount X.
  2. Label the other quantities in terms of X
  3. Write the equation
  4. Solve for X
  5. Solve the problem
  6. Check your answer

NAME ______________________________

What geometric figure describes a parrot that has flown out of its cage?

To find out, solve each equation. Then find your answer in the code below and write the letter for that exercise. Some answers are not used.

1. $-2x + 3 = -3$ **G**

$-2x + 3 + (-3) = -3 + (-3)$

$-2x + 0 = -6$

Multiply both sides of the equation by the reciprocal of -2 to get x by itself.

$(-\frac{1}{2})(-2x) = (-\frac{1}{2})(-6)$

$x = 3$

2. $-5b + 1 = -9$ **C**

3. $16 - 6n = -8$ **P**

4. $2 - 3d = 8$ **L**

5. $-4k - 8 = 12$ **N**

6. $15 - 3z = -3$ **A**

7. $8 - 9y = -10$ **B**

8. $-2w - 1 = -3$ **O**

9. $35 - 7y = 0$ **P**

10. $-4h - 6 = 22$ **Y**

11. $-7m - 9 = -2$ **O**

12. $-9z + 11 = 47$ **G**

___	___	___	___	___	G	___	___
6	4	−1	−2	−7	3	1	−5

NAME ____________________

Solve each equation.

1. $x - 6 = -10$ $x = -4$

$x + (-6) = -10$

$x + (-6) + 6 = -10 + 6$

$x + 0 = -4$

$x = -4$

First change subtraction to addition of the opposite.

2. $-3 - n = 12$ ______

$-3 + (-n) + 3 = 12 + 3$

$-n = 15$

$n = -15$

Since the opposite of *n* is 15, *n* must be −15.

3. $q - 4 = 5$ ______

4. $s - 9 = -4$ ______

5. $a - 8 = -11$ ______

6. $-10 - d = 7$ ______

7. $-9 - y = 3$ ______

8. $-7 - r = -15$ ______

9. $g - 10 = -6$ ______

10. $w - 11 = 9$ ______

11. $z - 5 = -8$ ______

12. $8 - t = 10$ ______

13. $2 - p = -2$ ______

14. $13 - c = 4$ ______

NAME ______________________________

Solve each equation.

1. $4x + 7 = 35$ $\underline{x = 7}$

$4x + 7 - 7 = 35 - 7$

$4x = 28$

$\frac{4x}{4} = \frac{28}{4}$

$x = 7$

2. $13m - 50 = 28$ $\underline{m = 6}$

$13m - 50 + 50 = 28 + 50$

$13m = 78$

$\frac{13m}{13} = \frac{78}{13}$

$m = 6$

3. $5y - 2 = 43$ ________

4. $3k + 8 = 29$ ________

5. $9c - 7 = 29$ ________

6. $5d + 12 = 42$ ________

7. $7r - 39 = 24$ ________

8. $144 = 12m + 48$ ________

9. $33 = 6x - 15$ ________

10. $16p + 49 = 129$ ________

11. $24n - 42 = 246$ ________

12. $30t - 94 = 296$ ________

NAME ___

Solve each equation. Then follow your answers through the maze below from Start to Finish.

1. $x + 7 = 16$ $x = 9$

$x + 7 - 7 = 16 - 7$
$x = 9$

Subtract 7 from both sides to get x by itself.

2. $y - 15 = 27$ $y = 42$

$y - 15 + 15 = 27 + 15$
$y = 42$

Add 15 to both sides to get y by itself.

3. $a + 4 = 12$ ___

4. $x + 8 = 15$ ___

5. $13 = n + 7$ ___

6. $t - 14 = 16$ ___

7. $c - 25 = 8$ ___

8. $g - 19 = 18$ ___

9. $8 + b = 26$ ___

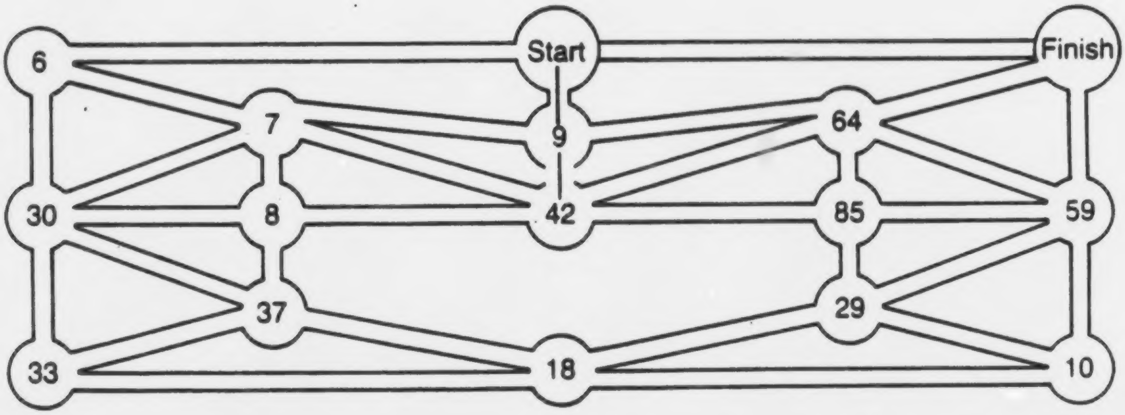
10. $21 = v - 8$ ___

11. $30 = 20 + r$ ___

12. $77 + k = 136$ ___

13. $m + 17 = 102$ ___

14. $p - 39 = 25$ ___


6
Start
Finish
7
9
64
30
8
42
85
59
37
29
33
18
10

NAME ____________________

Find each difference. Then circle your answers in the boxes until you complete one row.

−10	−28	−27	3	−37	12
−50	−1	−19	20	−4	−5
−6	25	2	−16	16	27
−30	75	7	−20	3	−13
−25	5	[✓ 1]	−24	19	−3
4	−8	0	30	−7	22

1. −8 − (−9) 1

To subtract an integer, add its opposite.

2. −2 − (−7) ____

3. 15 − 21 ____

4. 3 − 7 ____

5. −3 − 7 ____

6. −9 − (−8) ____

7. 6 − 3 ____

8. 7 − (−5) ____

9. 9 − 16 ____

10. −12 + 19 ____

11. 4 − 4 ____

12. 0 − 8 ____

13. 13 − 16 ____

14. −19 − 8 ____

15. 13 − (−14) ____

16. −15 + 20 ____

17. 11 − (−11) ____

18. −19 −9 ____

19. 50 − 66 ____

20. −13 − 11 ____

21. −11 + 13 ____

22. −18 − 19 ____

23. 56 − 36 ____

24. 20 − 50 ____

25. 7 − (−23) ____

NAME ____

Find each quotient.

1. −36 ÷ (−9) __4__
   ↑ ↑ ↑
   same sign positive

2. −36 ÷ 9 __4__
   ↑ ↑ ↑
   different signs negative

3. 36 ÷ 9 ________

4. 24 ÷ (−6) ________

5. −30 ÷ 5 ________

6. 15 ÷ 3 ________

7. −28 ÷ (−7) ________

8. 72 ÷ 9 ________

9. −63 ÷ 7 ________

10. −70 ÷ (−14) ________

11. −52 ÷ 13 ________

12. 169 ÷ (−13) ________

13. $\frac{-48}{-6}$ ________

14. $\frac{81}{9}$ ________

15. $\frac{27}{-3}$ ________

16. $\frac{-36}{-4}$ ________

17. $\frac{-23}{1}$ ________

18. $\frac{54}{-9}$ ________

19. $\frac{-90}{30}$ ________

20. $\frac{0}{-5}$ ________

21. $\frac{-50}{-50}$ ________

Give each missing number.

22. −3(☐) = −18

23. −21 ÷ 7 = ☐

24. ☐(−5) = −25

25. −5(☐) = 20

26. 7(☐) = −42

27. −32 ÷ 8 = ☐

28. −7(☐) = −56

29. ☐(4) = −12

30. −8(☐) = 40

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 21

B. Topic: Special Topics

C. Prerequisite: Equations

D. Purpose: Factoring, Graphs, and Slopes

E. Performance Objective: The student will apply concepts of algebra to solve problems with inequalities, factoring, and slopes.

1. Activity:
   a. The student will practice exercises 1-24 in inequalities
   b. The student will practice exercises 1-20 in factors.
   b. The student will prPractice exercises 1-21 in graphing.

2. Conditions: Classroom

3. Standards: 80% on practice exercises

F. ______________________________
(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XXI

I. Special Topics

- A. Solving Inequalities
  - 1. Two algebraic expressions are not equal.
  - 2. Variables
  - 3. Graph the solution
- B. Factoring
  - 1. An algebraic expression with two terms
    - a. Find a number and/or a variable that divides evenly into both terms
    - b. Divide to find the other factor
  - 2. To factor a quadratic expression with three terms
    - a. Find all possible factors of the whole number third term
    - b. Find the integer factors from step one that can be combined to make the number part of the middle term
    - c. Write the two factors with the variable as the first term in each factor
    - d. Check your work -- multiply both terms of the second factor by each term in the first factor
- C. Graphs
  - 1. Coordinate system
  - 2. Grid
  - 3. X Axis
  - 4. Y Axis
  - 5. Origin
- D. Graphing Equations
  - 1. An equation with two variables
    - a. Choose any value for one variable and substitute it into the equation
    - b. Solve the equation for the other variables
    - c. Write the solution as an ordered pair (X,Y)
- E. Slope
  - 1. Choose any two points on the line
  - 2. Use formula to find slope (M)

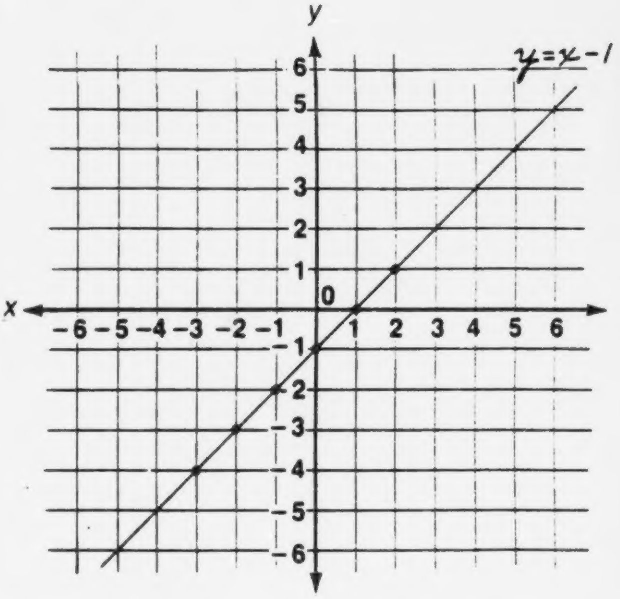
$$M = \frac{Y2 - Y1}{X2 - X1}$$

NAME

Draw a graph for each table and equation below. Use the same grid for all the graphs in exercises 1–3. Exercise 1 is done for you.

1. $y = x - 1$

x	-3	-2	-1	0	1	2
y	-4	-3	-2	-1	0	1



2. $y = x + 2$

x	-5	-4	-3	0	2	3
y	-3	-2	-1	2	4	5

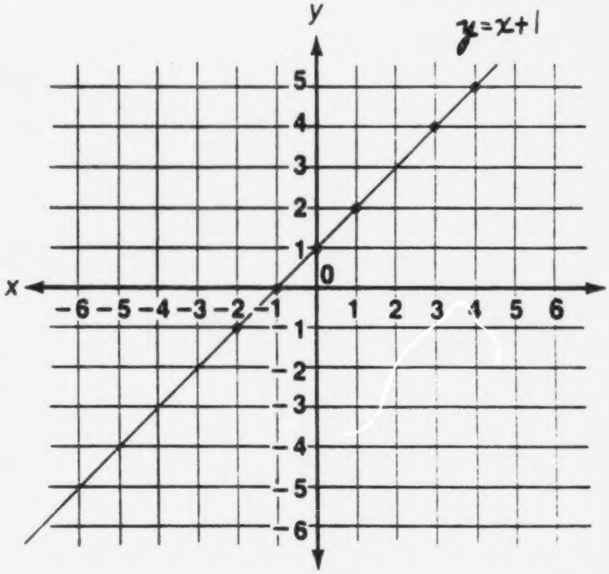
3. $y = 3x$

x	-2	-1	0	1	2
y	-6	-3	0	3	6

Complete each table and draw the graph.
Use the same grid for all graphs in exercises 4–6.
Exercise 4 is done for you.

4. $y = x + 1$

x	-2	-1	0	1	3	4
y	-1	0	1	2	4	5



5. $y = x - 2$

x	-3	-1	0	2	4	5
y	-5	-3				

6. $y = 2x$

x	-3	-2	-1	0	1	2
y	-6					

NAME ______________________________

For each table, write the letter of the equation at the right that fits the data.

1.

1	2	3	4	5	6	7
0	1	2	3	4	5	6

C.

2.

−1	0	1	2	3	4	5
2	3	4	5	6	7	8

______

3.

−1	1	2	3	4	5	6
−2	2	4	6	8	10	12

______

4.

0	−1	−3	2	5	1	4
2	1	−1	4	7	3	6

______

a. $y = x + 3$

b. $y = 2x$

c. $y = x - 1$

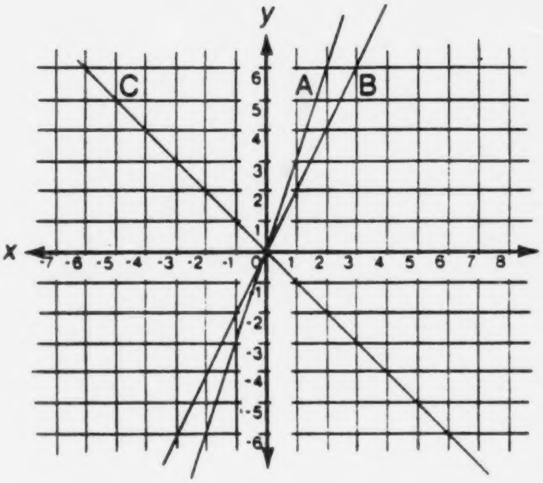
d. $y = x + 2$

Make a table for Graphs A, B, and C.
Then write an equation for each graph.

5. Table for Graph A

x	−2	−1	0	2
y	−6	−3	0	6

6. Equation for Graph A $y = 3x$



7. Table for Graph B

x				
y				

8. Equation for Graph B ______________

9. Table for Graph C

x				
y				

10. Equation for Graph C ______________

NAME ____________________

Here are seven test scores.

83, 72, 94, 83, 90, 91, 75

Arrange the scores from least to greatest.

72, 75, 83, 83, 90, 91, 94

Find the

1. mean. 84

The sum of the scores is 588. 588 divided by 7, the number of scores, is 84.

2. median. 83

83 is the middle number.

3. mode. 83

83 occurs most often.

Here are five test scores.

78, 88, 90, 74, 90

Find the

4. mean. ____________

5. median. ____________

6. mode. ____________

An animal hospital recorded the weights in grams of nine kittens.

120, 115, 110, 100, 115, 100, 129, 115, 95

Find the

7. mean. ____________

8. median. ____________

9. mode. ____________

A city planner recorded the number of floors of seven buildings.

42, 15, 33, 66, 98, 11, 15

Find the

10. mean. ____________

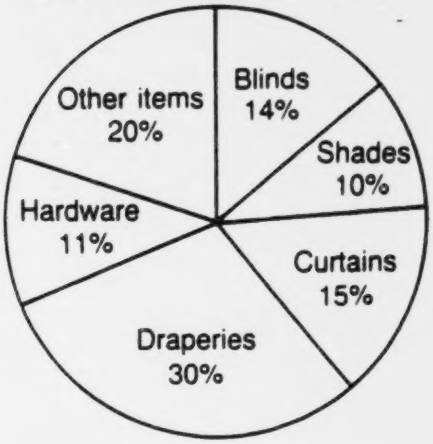
11. median. ____________

12. mode. ____________

NAME ______________________________

This circle graph shows how $150,000 was spent by customers at the Home Decorating Shop. Use the information in the graph to find each answer below.

Home Decorating Shop Sales



About how much money was spent on

1. blinds? $21,000

14% of 150,000 is ___.

$0.14(150,000) = \underline{n}$

$21,000 = \underline{n}$

2. hardware? ____________

3. curtains? ____________

4. draperies? ____________

5. shades? ____________

6. other items and hardware? ________

7. blinds and shades? ____________

8. curtains and draperies? ________

9. other items? ____________

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 22

B. Topic: Exponents and Roots

C. Prerequisite: Special Topics

D. Purpose: Algebraic Functions

E. Performance Objective: The student should be able to demonstrate an understanding of exponents and roots.

1. Activity:
   - a. The student will complete exercises 1-57 Unit 22.
   - b. The student will complete exercises 1-6 Unit 22 in solving word problems.
   - c. The student will complete a quiz.
   - d. The student will review algebra.
2. Conditions: Classroom
3. Standards: 80% on practice exercises and quiz

F. ______________________________

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XXII

I. Exponents And Roots

- A. Exponents
  - 1. Repeated multiplication
  - 2. Exponent is the same as the number of zeros
  - 3. Scientific notation
- B. Square Roots
  - 1. A number multiplied by itself
  - 2. Estimation
  - 3. Sometimes not a whole number
- C. Solving Word Problems
  - 1. Work backwards
  - 2. Equations
  - 3. Correlation chart

NAME ______________________________

Ted St. Martin holds the record for the most consecutive free throws in basketball.

To find the record, complete each exercise. In the boxes below, cross out the number under each answer. The remaining number will be the record.

Multiply.

1. $\sqrt{4} \times \sqrt{36}$ 12

2×6

12

2. $\sqrt{4} \times \sqrt{49}$ ________

3. $\sqrt{8} \times \sqrt{50}$ 20

$\sqrt{8 \times 50}$

$\sqrt{400}$

20

4. $\sqrt{3} \times \sqrt{108}$ ________

5. $\sqrt{2} \times \sqrt{8}$ ________

6. $\sqrt{8} \times \sqrt{32}$ ________

Divide.

7. $\frac{\sqrt{3}}{\sqrt{27}}$ $\frac{1}{3}$

$\sqrt{\frac{3}{27}}$

$\sqrt{\frac{1}{9}}$

$\frac{1}{3}$

8. $\frac{\sqrt{4}}{\sqrt{9}}$ ________

9. $\frac{\sqrt{4}}{\sqrt{16}}$ ________

10. $\frac{\sqrt{9}}{\sqrt{25}}$ ________

11. $\frac{\sqrt{49}}{\sqrt{81}}$ ________

12. $\frac{\sqrt{3}}{\sqrt{12}}$ ________

Answer	18	$\frac{1}{3}$	$\frac{2}{3}$	14	$\frac{7}{9}$	$\frac{3}{5}$	20	$\frac{1}{4}$	12	16	$\frac{1}{2}$	4	$\frac{1}{2}$
Free throws	75	~~126~~	100	200	95	500	~~150~~	2036	~~126~~	203	372	1000	141

NAME ____________________

What will not allow you to have the last word?

To find out, simplify each expression. Then find each answer below and cross out the letter above it. The remaining letters spell the answer.

1. $\sqrt{48}$ ____________

$$\sqrt{48} = \sqrt{2\times2\times2\times2\times3}$$
$$= \sqrt{2^2\times2^2\times3}$$
$$= \sqrt{2^2}\times\sqrt{2^2}\times\sqrt{3}$$
$$= 2\times2\times\sqrt{3} = 4\sqrt{3}$$

2. $\dfrac{4\sqrt{21}}{2\sqrt{3}}$ ____________

$$\frac{4\sqrt{21}}{2\sqrt{3}} = \frac{4}{2}\times\sqrt{\frac{21}{3}}$$
$$= 2\sqrt{7}$$

3. $\sqrt{20}$ ____________

4. $\sqrt{44}$ ____________

5. $\sqrt{60}$ ____________

6. $\sqrt{72}$ ____________

7. $\sqrt{84}$ ____________

8. $\sqrt{90}$ ____________

9. $\sqrt{96}$ ____________

10. $\dfrac{4\sqrt{15}}{2\sqrt{5}}$ ____________

11. $\dfrac{16\sqrt{12}}{4\sqrt{3}}$ ____________

12. $\dfrac{12\sqrt{35}}{3\sqrt{5}}$ ____________

W	A	I	U	N	F
$2\sqrt{15}$	$3\sqrt{5}$	$4\sqrt{6}$	$4\sqrt{3}$	9	$6\sqrt{2}$

E	D	T	C	M	F	R	H	W	P	O	V
3	$3\sqrt{10}$	$2\sqrt{5}$	16	$2\sqrt{7}$	$2\sqrt{11}$	8	$\sqrt{5}$	$4\sqrt{7}$	$2\sqrt{21}$	10	$2\sqrt{3}$

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 23

B. Topic: Geometry

C. Prerequisite: Algebra

D. Purpose: Measurement of Size and Slopes

E. Performance Objective: The student should be able to use geometric formulas for problem solving.

1. Activity:
   a. The student will practice exercises 1-19 Unit 23.
   b. The student will practice exercises 1-6 Unit 23 in solving word problems.
2. Conditions: Classroom
3. Standards: 80% on practice exercises

F. ______________________________
(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XXIII

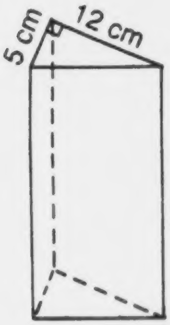
I. Geometry

- A. Terms and Definitions
  - 1. Line segment
  - 2. ARL
  - 3. Angle
  - 4. Right angle
  - 5. Dimension
  - 6. Plane
  - 7. Geometry
  - 8. Triangle
  - 9. Scale
  - 10. Pythagorean theorem
- B. Volume
  - 1. Perimeter
    - a. measure of distance around the edge of any flat object or figure
  - 2. Circumference
    - a. The perimeter of a circle
    - b. $C = \pi d$
  - 3. Area
    - a. The measure of a flat object or figure
  - 4. Volume
    - a. The measure of the inside space of a 3 dimensional object
    - b. Rectangular solid
      - 1. Cube
      - 2. Cylinder
    - c. Formula rectangular solid
      - 1. $V = A \times h$
    - d. Cube
      - 1. $V = A \times h$
    - e. Cylinder
      - 1. $V = \pi \times r^2 \times h$
    - f. Pyramid
      - 1. $V = 1/3 \times A \times h$
    - g. Cone
      - 1. $V = 1/3 \times r^2 \times h$
      - 2. $V = 1/3\ \pi \times r^2 \times h$
- C. Solving Word Problems
  - 1. Converting measurements
    - a. Avoid fractions
    - b. Use ratios
  - 2. Formula for a rectangular solid
    - a. $V = lwh$
    - b. Convert measurements to the same unit of measure

NAME ____________________

Find each volume.

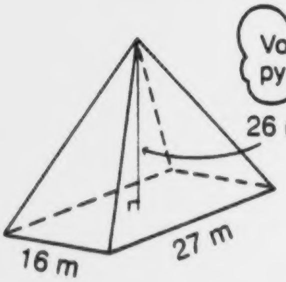
1. $V =$ $750\,cm^3$


5 cm
12 cm
25 cm

Volume of a prism: $V = Bh$.

$V = \frac{1}{2}(5)(12)(25)$
$V = 750$

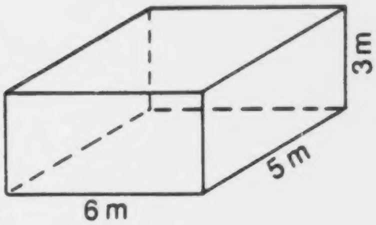
2. $V =$ $3744\,m^3$



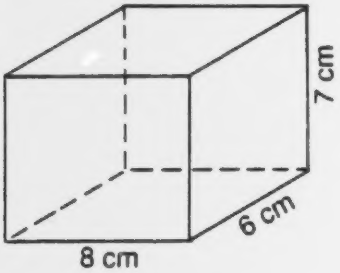
Volume of a pyramid: $V = \frac{1}{3}Bh$.

$V = \frac{1}{3}(16)(27)(26)$
$V = 3744$

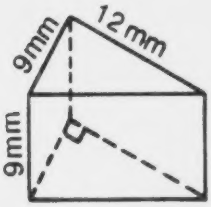
3. $V =$ ____________



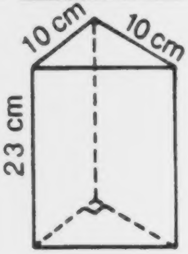
4. $V =$ ____________



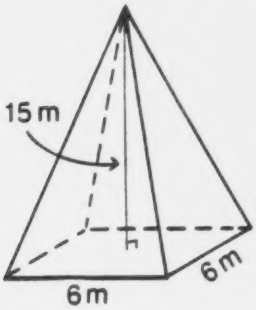
5. $V =$ ____________


9mm
12 mm
9mm

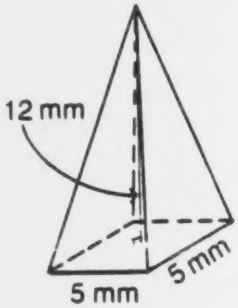
6. $V =$ ____________


10 cm
10 cm
23 cm

7. $V =$ ____________



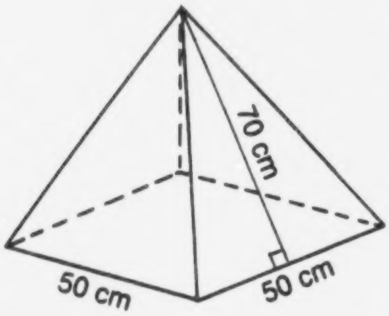
8. $V =$ ____________


12 mm
5 mm
5 mm

NAME ______________________________

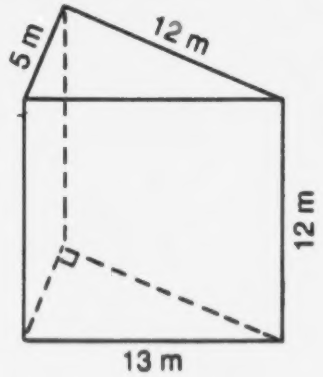
Complete the tables to find the total surface area of each polyhedron.

1. Square pyramid 9500 cm^2


70 cm
50 cm
50 cm

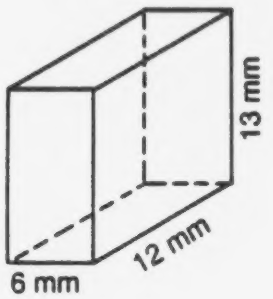
Shape of face	Area in cm^2
Triangle	$\frac{1}{2}(70)(50) = 1750$
Triangle	$\frac{1}{2}(70)(50) = 1750$
Triangle	$\frac{1}{2}(70)(50) = 1750$
Triangle	$\frac{1}{2}(70)(50) = 1750$
Square	$50(50) = 2500$
	Total: 9500

2. Triangular prism ________


5 m
12 m
12 m
13 m

Shape of face	Area in m^2
	Total:

3. Rectangular prism ________


13 mm
12 mm
6 mm

Shape of face	Area in mm^2
	Total:

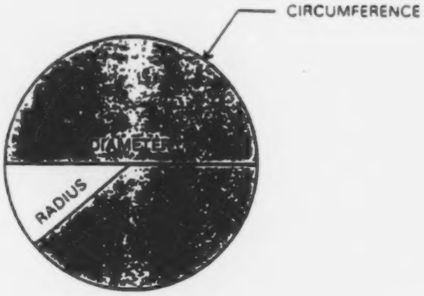
Unit 19

CIRCULAR MEASURE

INTRODUCTION

Working with circles and circular features will present no problem to the welder familiar with the basic mathematic characteristics of the circle. To begin, here is the terminology you will need to know:

1. The **circumference** is the distance around a circle.
2. The **diameter** is the straight line distance across a circle and passing through the center.
3. The **radius** is the straight line distance from the center to the edge of a circle.



If you know certain characteristics of a circle, you can calculate other characteristics.

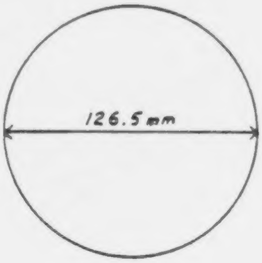
CIRCUMFERENCE OF A CIRCLE

If you know the diameter of a circle, the circumference can be calculated from the following formula:

$$C = \pi \times D$$
$$\text{Circumference} = \pi \times \text{Diameter}$$

This formula requires some explanation. The symbol π is actually a letter from the Greek language and it represents the number 3.14. It is spelled "pi," but is pronounced "pie." By multiplying the diameter of a circle by this number, you will arrive at the circumference.

So, the diameter and circumference are related to each other through the number π



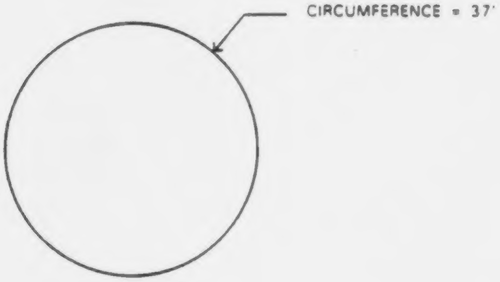
$$\begin{aligned} \text{Circumference} &= \pi \times D \\ C &= 3.14 \times 126.5 \\ C &= 397.21 \text{ mm} \end{aligned}$$

DIAMETER OF A CIRCLE

If the circumference is known, the diameter of a circle can be calculated from the following formula:

$$D = \frac{C}{\pi}$$

$$\text{Diameter} = \frac{\text{Circumference}}{\pi}$$



$$\text{Diameter} = \frac{C}{\pi}$$

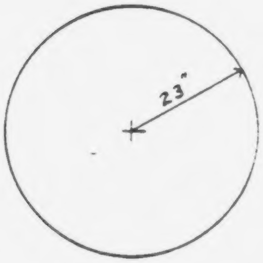
$$D = \frac{37}{3.14}$$

$$D = 11.8 \text{ ft. (rounded)}$$

AREA OF A CIRCLE

The area of a circle can be calculated if the radius is known.

$$\begin{aligned} A &= \pi \times R \times R \\ \text{Area} &= \pi \times \text{Radius} \times \text{Radius} \end{aligned}$$



Area = $\pi \times R \times R$
A = $3.14 \times 23 \times 23$
A = 1,661 sq. in. (rounded)

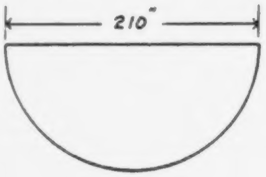
The formulas for circumference, diameter, and area are extremely important and you should memorize them.

CIRCULAR SHAPES

Many fabricated objects consist of partial circles and straight lines. By recognizing basic shapes within these objects, some important characteristics can be calculated. These three examples shown here will give you some guidance.

HALF CIRCLE

Given the information on the drawing, the perimeter and area can be calculated.



PERIMETER OF A HALF CIRCLE

The perimeter is equal to the straight line length of 210 in. plus one half the circumference of a circle with a diameter of 210 in.

$$C = \pi \times D$$

Circumference (half circle) = $\frac{\pi \times D}{2} = \frac{3.14 \times 210 \text{ in.}}{2} = 329.7$ in.

Perimeter (half circle) = $329.7 + 210 = 539.7$ in.

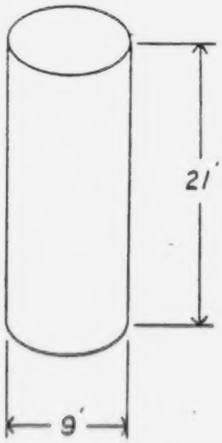
AREA OF A HALF CIRCLE

The area is one half the area of a circle with a radius of 105 in.

Area (half circle) = $\frac{\pi \times R \times R}{2} = \frac{3.14 \times 105 \text{ in.} \times 105 \text{ in.}}{2} = 17{,}309.25$ sq. in.

CYLINDER

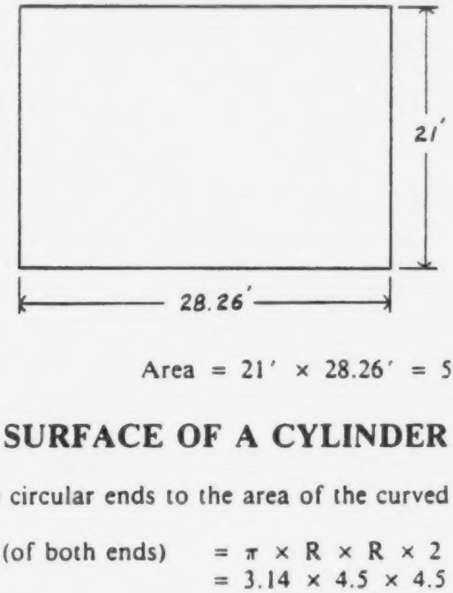
Given the information on the drawing, the area of the curved surface and the area of the entire surface can be calculated.



AREA OF CURVED SURFACE

Calculate the circumference and redraw the curved surface as a flat rectangle; then, calculate the area.

$$C = \pi \times D$$
$$C = 3.14 \times 9' = 28.26 \text{ ft.}$$



Area = 21' × 28.26' = 593.46 sq. ft.

AREA OF ENTIRE SURFACE OF A CYLINDER

Add the area of the two circular ends to the area of the curved surface.

$$\begin{aligned}\text{Area (of both ends)} &= \pi \times R \times R \times 2\\ &= 3.14 \times 4.5 \times 4.5 \times 2\\ &= 127.17 \text{ sq. ft.}\end{aligned}$$

$$\begin{aligned}\text{Area of entire surface} &= 127.17 + 593.46\\ &= 720.63 \text{ sq. ft.}\end{aligned}$$

Unit 33 VOLUME OF CYLINDRICAL SOLIDS

BASIC PRINCIPLES

Review and apply the principles of volume of cylindrical solids to these problems.

Review denominate numbers in section I of the appendix.

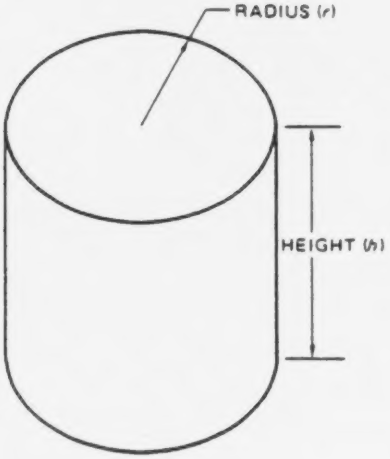
Review the table of equivalent units of volume measure for solids in section II of the appendix.

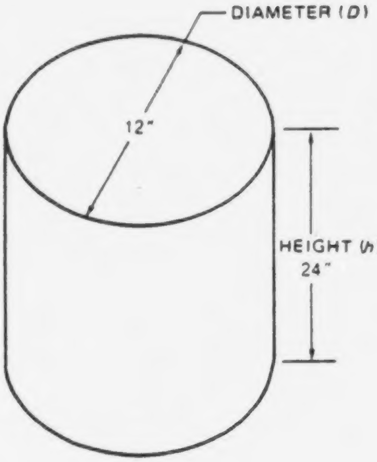
PRACTICAL PROBLEMS

Round all answers to three decimal places when needed.

Note: Use this information for problems 1-10.

The volume of a cylindrical solid is:





$V = \pi \times r \times r \times h$

$$\begin{aligned} V &= 3.14 \times 6'' \times 6'' \times 24'' \\ &= 3.14 \times 36'' \times 24'' \\ &= 113.04 \times 24'' \\ &= 2712.96 \text{ cu in} \end{aligned}$$

where $\pi = 3.14$.

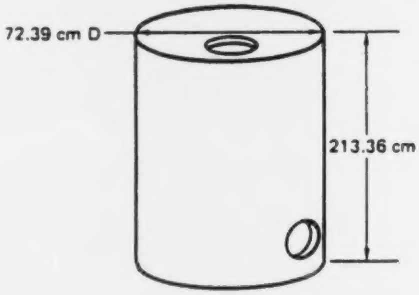
Find, in cubic inches, the volume of each piece of round stock.

1. D = 10 in; h = 60 in
2. D = 48 in; h = 48 in
3. D = 8.125 in; h = 59.875 in
4. D = 10.625 in; h = 72.75 in

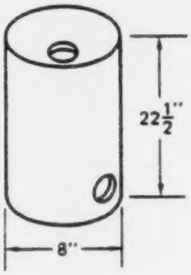
Remember: All dimensions must be given in the same unit of measure before multiplying, that is, inches by inches, feet by feet, and so on.

Find, in cubic feet, the volume of each cylinder.

5. r = 12 in; h = 48 in
6. r = 3 in; h = 120 in
7. D = 12 in; h = 24 in
8. D = 8.375 in; h = 22.125 in
9. What is the volume, in cubic centimetres, of this storage tank?



10. Find, in cubic inches, the volume of 17 of these small welded hydraulic tanks.



LESSON PLAN

A. Course Title: WPL Math   B. Plan Number: 24

B. Topic: Geometry

C. Prerequisite: Volume

D. Purpose: Angles

E. Performance Objective: The student should be able to use angles in problem solving.

1. Activity:
    a. The student will practice exercises 1-36 Unit 24.
    b. The student will practice exercises 16 in solving word problems.
2. Conditions: Classroom
3. Standards: 80% on practice exercises

F. ______________________________

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XXIV

I. Angles

- A. Space Between a Pair of Connected Lines
  1. Angle
  2. Rays
  3. Obtuse
  4. Straight
- B. Reflex
- C. Congruent Angles
  1. Has equal measures
  2. Opposite angles are congruent
- D. Intersect
  1. Vertical Angles
  2. Perpendicular
- E. Adjacent Angles
  1. Common vertex
  2. Common ray
- F. Non-adjacent Angles
- G. Parallel
  1. Two lines
  2. On the same plane
- H. Transverse
  1. Line crosses two or more parallel lines
  2. Pairs of angles
- I. Corresponding Angles
  1. On same site of a transversa
  2. Either below or above the two parallel lines
- J. Alternate
  1. Exterior
  2. Interior
- K. Complementary Angles
  1. Sum of their measures = 90°
- L. Supplementary Angles
  1. Sum of the measures = 180°
- M. Solving Word problems
  1. Draw shape indicated in problem
  2. Write information on problem in the correct place
  3. Perform operations to convert information to a usable form
  4. Identify what you are being asked to find
  5. Solve the problem

NAME ______________________________

Find the area of each rectangle. (A = *l* × *w*)

1. An ink pad, 11 cm by 7 cm $77 cm^2$

$$\begin{array}{r} 11 \\ \times 7 \\ \hline 77 \end{array}$$

2. A driver's license, 8.5 cm by 5.5 cm ______________

3. A piece of paper, 28 cm by 21 cm ______________

4. A card, 9.5 cm by 6.0 cm ______________

5. A wall, 12 m by 9 m ______________

6. A door, 2.1 m by 1.6 m ______________

7. A record album, 31.4 cm by 31.1 cm ______________

8. A credit card, 8.5 cm by 4.4 cm ______________

9. An envelope, 24 cm by 11 cm ______________

10. A paperback cover, 17.5 cm by 10.0 cm ______________

11. A roof, 13.5 m by 9.5 m ______________

12. A ruler, 33 cm by 4 cm ______________

NAME ______________________________

Find the volume of each box.

1. 2 dm by 3 dm by 4 dm

   60 dm^3

   $V = l \times w \times h$

   $V = 3 \times 5 \times 4$

   $V = 60$

   Volume = 60 dm^3

2. 4 cm by 6 cm by 9 cm

3. 2 cm by 6 cm by 3 cm

4. 4 dm by 2 dm by 5 dm

5. 5 dm by 3 dm by 4 dm

6. 5 cm by 5 cm by 5 cm

7. 7 cm by 3 cm by 6 cm

8. 6 dm by 5 dm by 4 dm

9. 4 dm by 6 dm by 3 dm

10. 5 cm by 7 cm by 8 cm

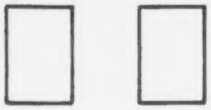
11. 9 cm by 6 cm by 10 cm

12. 11 dm by 8 dm by 12 dm

NAME ______________________________

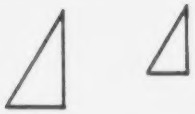
Do the polygons appear to be congruent? Write *yes* or *no*.

1. Yes

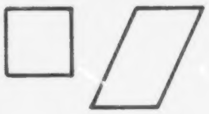


Congruent polygons have the same size and shape.

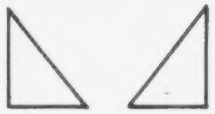
2. ______



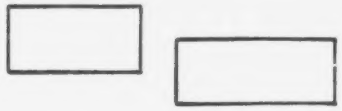
3. ______



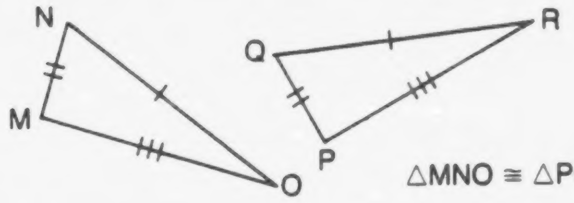
4. ______



5. ______



For each pair of congruent polygons, give the corresponding side or angle



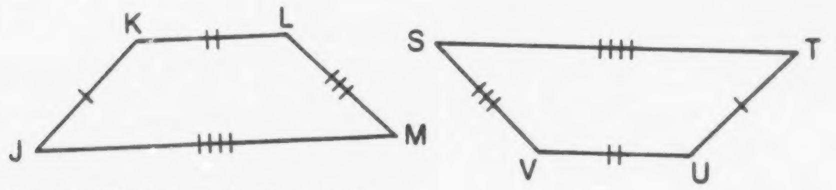
△MNO ≅ △PQR

6. ∠M ∠P

7. $\overline{QR}$ ______

8. ∠R ______

9. $\overline{PQ}$ ______



Polygon JKLM ≅ polygon TUVS

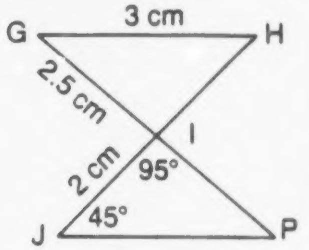
10. $\overline{KL}$ ______

11. ∠S ______

12. $\overline{UT}$ ______

13. ∠J ______

Give the measures of these segments and angles.
△GHI ≅ △PJI



In any triangle, the sum of the measures of the angles is 180°.

14. ∠P ______

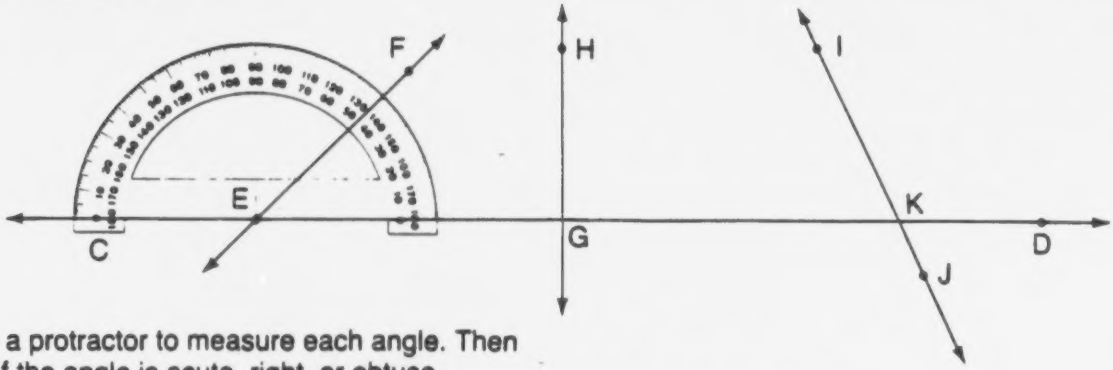
15. $\overline{JP}$ ______

16. $\overline{PI}$ ______

17. ∠G ______

NAME ______________________________

Use this diagram for exercises.



Use a protractor to measure each angle. Then tell if the angle is acute, right, or obtuse.

1. ∠FEG 45°
Acute

An angle with a measure less than 90° is an acute angle. An angle that measures 90° is a right angle. An angle greater than 90° is an obtuse angle.

2. ∠CEF ______________

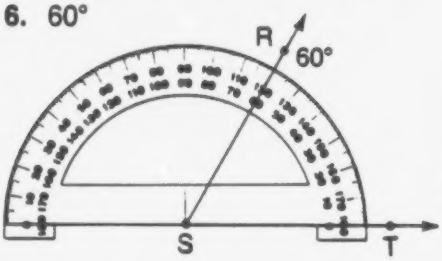
3. ∠HGD ______________

4. ∠IKD ______________

5. ∠IKG ______________

Use a protractor to draw an angle with the given measure.

6. 60°



Draw and label ray ST. Line up the protractor with point S. Find 60°. Draw ray SR.

7. 85°

8. 130°

9. 90°

LESSON PLAN

A. Course Title: WPL Math B. Plan Number: 25

B. Topic: Geometry

C. Prerequisite: Angles

D. Purpose: Triangles and Quadrilaterals

E. Performance Objective: The student should be able to identify and define triangles and quadrilaterals.

1. Activity:
   a. The student will practice exercises 1-27 Unit 25.
   b. The student will practice exercises 1-6 in solving word problems.

2. Conditions: Classroom

3. Standards: 80% on practice exercises

F. ______________________________
(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XXV

I. Triangles And Quadrilaterals

  A. Triangles
    1. A geometric figure with three sides
    2. Triangle identification
      a. Length of sides
      b. Measure of angles
    3. Types of triangles by sides
      a. Equilateral
      b. Isosceles
      c. Scalene
    4. Types of triangles by angle
      a. Right
      b. Acute
      c. Obtuse
  B. Quadrilaterals
    1. Any geometric figure with four sides
      a. Parallelogram
      b. Rectangle
      c. Rhombus
      d. Trapezoid
  C. Solving Word Problems
    1. Use logical reasoning
    2. Assumptions

LESSON PLAN

A. Course number: WPL Math B. Plan Number: 26

B. Topic: Geometry

C. Prerequisite: Triangles and Quadrilaterals

D. Purpose: Congruence and Similarity

E. Performance Objective: The student should be able to identify and define similar and congruent figures.

1. Activity:
    - a. The student will practice exercises 1-37 Unit 26.
    - b. The student will solve word problems 1-6 Unit 26.
2. Conditions: Classroom
3. Standards: 80% on practice exercises

F. ______________________________

(Equipment, Materials, Resources Required)

Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XXVI

I. Congurence And Similarity

A. Congruence
  1. Same shape and size
  2. Congruent triangles
    a. Corresponding vertices
    b. Corresponding sides
    c. Corresponding angles

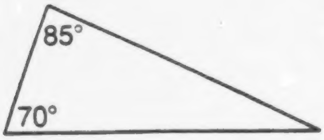
B. Similarity
  1. Triangles are similar if the corresponding angles have equal measure
  2. And the corresponding sides are in proportion

C. Solving Word Problems
  1. Use proportion to solve indirect measurement problems
  2. Scale drawings

NAME ____

Find the missing angle measure for each triangle.

1. 25°



Add the given measures.

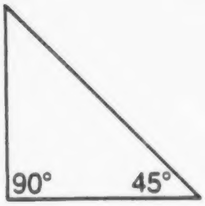
$$\begin{array}{r} 85^\circ \\ +\ 70^\circ \\ \hline 155^\circ \end{array}$$

Subtract the sum from 180°.

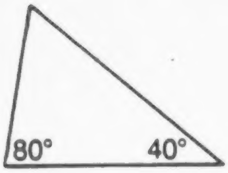
$$\begin{array}{r} 180^\circ \\ -\ 155^\circ \\ \hline 25^\circ \end{array}$$

In any triangle, the sum of the angle measures is 180°.

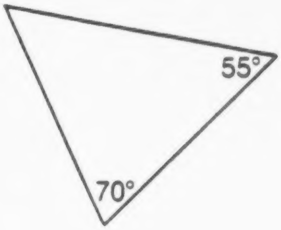
2. ______



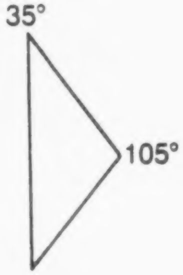
3. ______



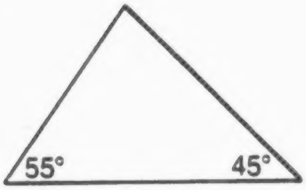
4. ______



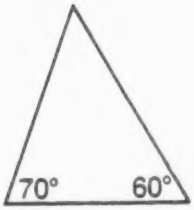
5. ______



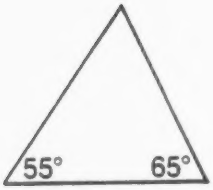
6. ______



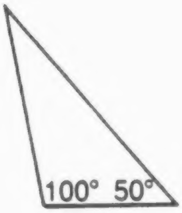
7. ______



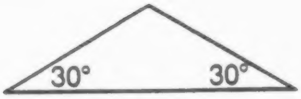
8. ______



9. ______

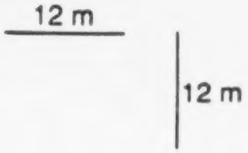


10. ______



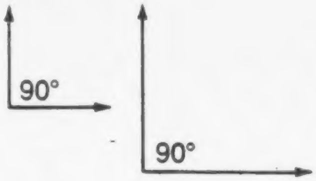
NAME

These are congruent segments.



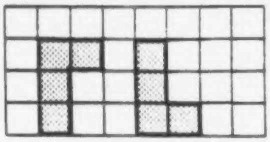
The segments have the same length.

These are congruent angles.



The angles have the same measure.

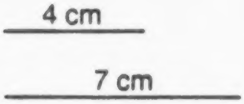
These are congruent figures.



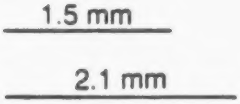
The figures have the same size and shape.

For each exercise, tell if the figures are congruent. Write *yes* or *no*.

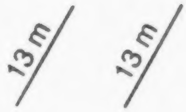
1. no



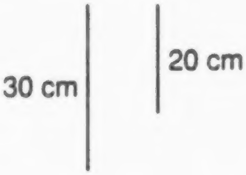
2. ____



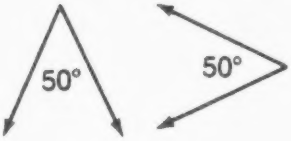
3. ____



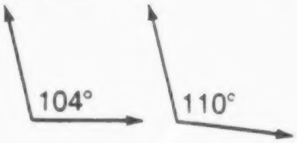
4. ____



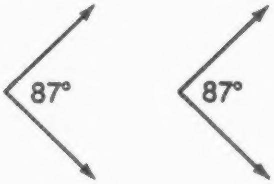
5. ____



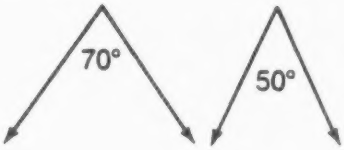
6. ____



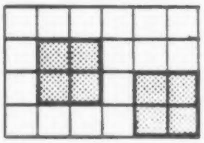
7. ____



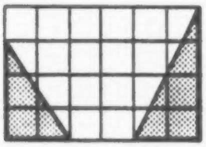
8. ____



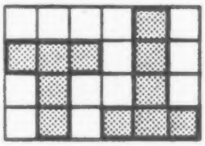
9. ____



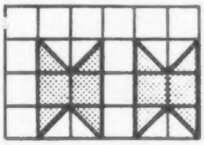
10. ____



11. ____



12. ____



LESSON PLAN

A. Course number: WPL Math B. Plan Number: 27

B. Topic: Geometry

C. Prerequisite: Congruence and Similarity

D. Purpose: Pythagorean Relationships

E. Performance Objective: The student should be able to solve problems using the Pythagorean theorem.

1. Activity:
    a. The student will practice exercises 1-18 Unit 27.
    b. The student will practice exercises 1-8 Unit 27 in word problems.
    c. The student will complete a quiz.
    d. The student will review geometry.

2. Conditions: Classroom

3. Standards: 80% on practice exercises and quiz

F. ____
(Equipment, Materials, Resources Required)

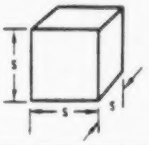
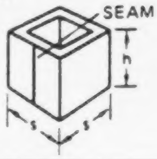
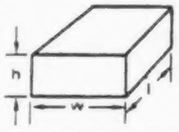
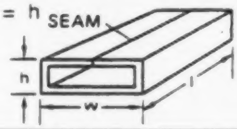
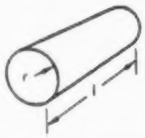
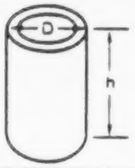
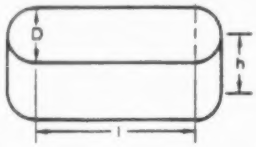
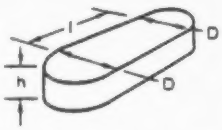
Quantity	Item
	GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

LECTURE OUTLINE

A. Course Title: WPL Math B. Lecture Number: XXVII

I. Pythagorean Relationships

- A. Theorem
  - 1. $C^2 = a^2+b^2$
  - 2. Hypotenuse
  - 3. Legs
- B. Solving Word Problems
  - 1. Use mental math
  - 2. Squares and Roots

Volume V = volume	**Stretchouts**
Cube $V = s^3$ s = side 	Square Pipe $LS = 4s$ $WS = h$ s = side h = height 
Rectangular Solid $V = lwh$ l = length w = width h = height 	Rectangular Pipe $LS = 2l + 2w$ $WS = h$ LS = length of stretchout WS = width of stretchout l = length w = width 
Cylinder $V = \pi r^2 l$ $\pi = 3.14$ r = radius l = length 	Circular Pipe $LS = \pi D$ $WS = h$ LS = length of stretchout WS = width of stretchout D = diameter h = height $\pi = 3.14$ 
Semicircular-sided Solid $V = (\pi r^2 + Dl)h$ $\pi = 3.14$ r = radius D = diameter l = distance between centers of semicircle h = height 	Semicircle Tanks $LS = \pi D + 2l$ $WS = h$ $\pi = 3.14$ D = diameter l = distance between centers of semicircles h = height 

Bend Allowance

(Approximate allowances)

For Inside Dimensions: T = thickness

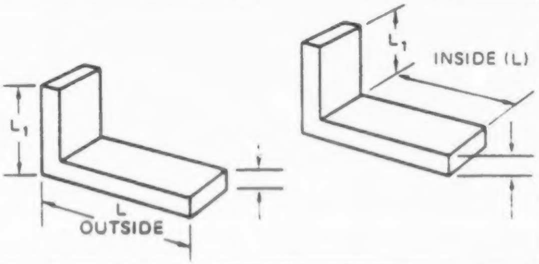
Length of Stretchout = L = long leg

L_1 = short leg

$$L + L_1 + \frac{T}{2}$$

For Outside Dimensions:

$$\text{Length of Stretchout} = L + L_1 - \frac{T}{2}$$

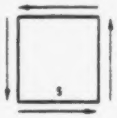


SECTION III

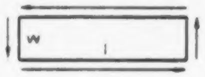
FORMULAS

Perimeter P = perimeter

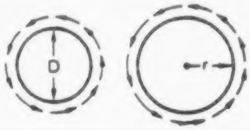
Square
P = 4s
P = perimeter
s = side



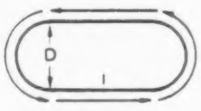
Rectangle
P = 2l + 2w
P = perimeter
l = length
w = width



Circle
C = πD
or
C = 2πr
C = circumference
π = 3.14
D = diameter
r = radius = $\frac{1}{2}$ D

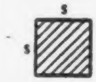


Semicircular-sided Figure
P = πD + 2l
P = perimeter
π = 3.14
D = diameter
l = length

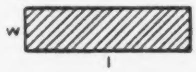


Area A = area

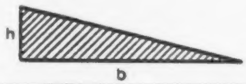
Square
A = s × s
s = length of side



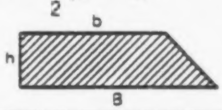
Rectangle
A = lw
l = length
w = width



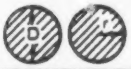
Triangle
A = $\frac{1}{2}$ bh
h = height
b = base



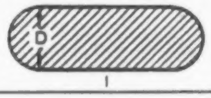
Trapezoid
A = $\frac{1}{2}$ (B + b)h
B = length of large side
b = length of small side
h = height



Circle
A = πr^2 or
A = $\frac{\pi}{4} D^2$
π = 3.14
r = radius
D = diameter



Semicircular-sided figure
A = πr^2 + Dl
π = 3.14
D = diameter
l = length
r = radius = 1/2D



VOLUME MEASURE FOR FLUIDS

1 gallon (gal) = 3 785.411 cubic centimetres (cm^3)
1 gallon (gal) = 3.785 411 litres (L)
1 quart (qt) = 0.946 353 litre (L)
1 ounce (oz) = 29.573 530 cubic centimetres (cm^3)
1 cubic centimetre (cm^3) = 0.000 264 gallon (gal)
1 litre (L) = 0.264 172 gallon (gal)
1 litre (L) = 1.056 688 quarts (qt)
1 cubic centimetre (cm^3) = 0.033 814 ounce (oz)

MASS MEASURE

1 pound (lb) = 0.453 592 kilogram (kg)
1 pound (lb) = 453.592 37 grams (g)
1 ounce (oz) = 28.349 523 grams (g)
1 ounce (oz) = 0.028 350 Kilograms (kg)
1 kilogram (kg) = 2.204 623 pounds (lb)
1 gram (g) = 0 002 205 pound (lb)
1 kilogram (kg) = 35.273 962 ounces (oz)
1 gram (g) = 0.035 274 ounce (oz)

ENGLISH-METRIC EQUIVALENTS

LENGTH MEASURE

1 inch (in) = 25.4 millimetres (mm)
1 inch (in) = 2.54 centimetres (cm)
1 foot (ft) = 0.304 8 metre (m)
1 yard (yd) = 0.914 4 metre (m)
1 mile (mi) ≈ 1.609 kilometres (km)
1 millimetre (mm) ≈ 0.039 37 inch (in)
1 centimetre (cm) ≈ 0.393 70 inch (in)
1 metre (m) ≈ 3.280 84 feet (ft)
1 metre (m) ≈ 1.093 61 yards (yd)
1 kilometre (km) ≈ 0.621 37 mile (mi)

AREA MEASURE

1 square inch (sq in) = 645.16 square millimetres (mm^2)
1 square inch (sq in) = 6.451 6 square centimetres (cm^2)
1 square foot (sq ft) ≈ 0.092 903 square metre (m^2)
1 square yard (sq yd) ≈ 0.836 127 square metre (m^2)
1 square millimetre (mm^2) ≈ 0.001 550 square inch (sq in)
1 square centimetre (cm^2) ≈ 0.155 00 square inch (sq in)
1 square metre (m^2) ≈ 10.763 910 square feet (sq ft)
1 square metre (m^2) ≈ 1.119 599 square yards (sq yd)

VOLUME MEASURE FOR SOLIDS

1 cubic inch (cu in) = 16.387 064 cubic centimetres (cm^3)
1 cubic foot (cu ft) ≈ 0.028 317 cubic metre (m^3)
1 cubic yard (cu yd) ≈ 0.764 555 cubic metre (m^3)
1 cubic centimetre (cm^3) ≈ 0.061 024 cubic inch (cu in)
1 cubic metre (m^3) ≈ 35.314 667 cubic feet (cu ft)
1 cubic metre (m^3) ≈ 1.307 951 cubic yards (cu yd)

METRIC VOLUME MEASURE EQUIVALENTS

1 cubic decimetre (dm^3)	=	1 litre (L)
1 000 cubic centimetres (cm^3)	=	1 litre (L)
1 cubic centimetre (cm^3)	=	1 millilitre (mL)

METRIC MASS MEASURE

10 milligrams (mg)*	=	1 centigram (cg)
10 centigrams (cg)	=	1 decigram (dg)
10 decigrams (dg)	=	1 gram (g)*
10 grams (g)	=	1 dekagram (dag)
10 dekagrams (dag)	=	1 hectogram (hg)
10 hectograms (hg)	=	1 kilogram (kg)*
1 000 kilograms (kg)	=	1 megagram (Mg)*

- ▲ To express a metric mass unit as a smaller metric mass unit, multiply by 10, 100, 1 000, 10 000, etc.
- ▲ To express a metric mass unit as a larger metric mass unit, multiply by 0.1, 0.01, 0.001, 0.000 1, etc.

Metric measurements are expressed in decimal parts of a whole number. For example, one-half millimetre is written as 0.5 mm.

In calculating with the metric system, all measurements are expressed using the same prefixes. If answers are needed in millimetres, all parts of the problem should be expressed in millimetres before the final solution is attempted. Diagrams that have dimensions in different prefixes must first be expressed using the same unit.

METRIC RELATIONSHIPS

The base units in SI metrics include the metre and the gram. Other units of measure are related to these units. The relationship between the units is based on powers of ten and uses these prefixes: kilo (1 000) hecto (100) deka (10) deci (0.1) centi (0.01) milli (0.001)

These tables show the most frequently used units with an asterisk (*).

METRIC LENGTH MEASURE

10 millimetres (mm)* = 1 centimetre (cm)*
10 centimetres (cm) = 1 decimetre (dm)
10 decimetres (dm) = 1 metre (m)*
10 metres (m) = 1 dekametre (dam)
10 dekametres (dam) = 1 hectometre (hm)
10 hectometres (hm) = 1 kilometre (km)*

▲ To express a metric length unit as a smaller metric length unit, multiply by a positive power of ten such as 10, 100, 1 000, 10 000, etc.

▲ To express a metric length unit as a larger metric length unit, multiply by a negative power of ten such as 0.1, 0.01, 0.001, 0.0001, etc.

METRIC AREA MEASURE

100 square millimetres (mm^2) = 1 square centimetre (cm^2)*
100 square centimetres (cm^2) = 1 square decimetre (dm^2)
100 square decimetres (dm^2) = 1 square metre (m^2)*
100 square metres (m^2) = 1 square dekametre (dam^2)
100 square dekametres (dam^2) = 1 square hectometre (hm^2)*
100 square hectometres (hm^2) = 1 square kilometre (km^2)

▲ To express a metric area unit as a smaller metric area unit, multiply by 100, 10 000, 1 000 000, etc.

▲ To express a metric area unit as a larger metric area unit, multiply by 0.01, 0.000 1, 0.000 001, etc.

METRIC VOLUME MEASURE FOR SOLIDS

1 000 cubic millimetres (mm^3) = 1 cubic centimetre (cm^3)*
1 000 cubic centimetres (cm^3) = 1 cubic decimetre (dm^3)*
1 000 cubic decimetres (dm^3) = 1 cubic metre (m^3)*
1 000 cubic metres (m^3) = 1 cubic dekametre (dam^3)
1 000 cubic dekametres (dam^3) = 1 cubic hectometre (hm^3)
1 000 cubic hectometres (hm^3) = 1 cubic kilometre (km^3)

▲ To express a metric volume unit for solids as a smaller metric volume unit for solids, multiply by 1 000, 1 000 000, 1 000 000 000, etc.

▲ To express a metric volume unit for solids as a larger metric volume unit for solids, multiply by 0.001, 0.000 001, 0.000 000 001, etc.

METRIC VOLUME MEASURE FOR FLUIDS

10 millilitres (mL)* = 1 centilitre (cL)
10 centilitres (cL) = 1 decilitre (dL)
10 decilitres (dL) = 1 litre (L)*
10 litres (L) = 1 dekalitre (daL)
10 dekalitres (daL) = 1 hectolitre (hL)
10 hectolitres (hL) = 1 kilolitre (kL)

▲ To express a metric volume unit for fluids as a smaller metric volume unit for fluids, multiply be 10, 100, 1 000, 10 000, etc.

▲ To express a metric volume unit for fluids as a larger metric volume unit for fluids, multiply by 0.1, 0.01, 0.001, 0.000 1, etc.

ACKNOWLEDGEMENTS

GED Mathematics, Cathy Fillmore-Hoyt, Doreen Stern, Steck-Vaughn, 1991.

Practical Problems in Mathematics for Welders, Frank R. Schell, Bill J. Matlock, Delmar Publishers Inc., 1988.

Math for Welders, Nino Marion Goodheart-Willcox, 1990.

Mathematics, Blackline Masters, Book 6, Scott Foresman.

Pueblo Community College Printshop.

HOME BUDGETING WORKSHOP FOR THE WORKPLACE

PUEBLO COMMUNITY COLLEGE

D. ALBER

TABLE OF CONTENTS

PAGE

Abstract 1

Objectives 2

Time and Materials 3

Course Plan 4

Workshop Outline 5

Benefits of Budget Planning 6

Workshop Syllabus 7

Conclusion 14

Bibliography 15

Handouts 17

HOME BUDGETING - WPL

Abstract

This workshop will focus on the basics of home budgeting, including the importance of identifying your assets and liabilities, organizing a recordkeeping system, setting up a monthly and yearly cash-flow system, and setting financial goals.

The keys to budgeting are goal setting and planning. A balance sheet, cash-flow statement, projected budget, and expense plan can be completed in order to help maintain control of home budgeting.

OBJECTIVES

Home Budgeting - WPL

At the completion of this course, the student should be able to:

- Learn the basics of home budgeting and record keeping
- Set a financial goal
- Prepare a balance sheet, a cash flow statement, and a projected budget plan
- Learn techniques for credit card management
- Set Personal goals and objectives for borrowing money

TIME AND MATERIALS

Timing

The class will meet three times a week, for one hour each session for a total of three hours of instruction.

Each session will consist of the following:

1. Presentation
2. Open Class Discussion
3. Written Classwork

Materials

Course Syllabus

Printed Informational Material

Classroom Assignments

Paper and Pencil

COURSE PLAN

Daily Plan for Class

Introduction (Or review of previous session)	5 Minutes
Presentation (Instruction)	30 Minutes
Class Discussion	20 Minutes
In Class Work Period	5 Minutes
TOTAL	60 Minutes

Total Program Plan

Introduction (And/or Review)	15 Minutes
Lecture	90 Minutes
Class Discussion	60 Minutes
In Class Work Period	15 Minutes
TOTAL	180 Minutes

WORKSHOP OUTLINE

HOME BUDGETING - WPL

At the completion of this workshop, the student should be able to budget and plan home expenses.

Session I

1. Identifying Present assists and liabilities
2. Setting Financial goals and objectives
3. Identifying and organizing appropriate records
4. Completing the balance sheet, and discussing types of ownership

Session II

1. Preparing a financial notebook
2. Preparing a cash flow statement
3. Preparing a personal budget
4. Preparing a projected budget

Session III

1. Reviewing a cash flow system
2. Identifying different types of bank accounts
3. Learning the pros and cons of credit cards and borrowing
4. Managing credit cards and the importance of a good credit rating

BENEFITS OF BUDGET PLANNING

- Help set financial goals and objectives
- Plan for future needs and desires
- Plan for retirement
- Control your own finances
- Live within your income
- Eliminate stress
- Eliminate family conflicts over money
- Problem Solving

WORKSHOP SYLLABUS

WORKSHOP PLAN

A. Workshop Title: Home Budgeting - WPL B. Session 1

C. Topic: Living Within Your Income

D. Prerequisite: None

E. Activity: Prepare a personal balance sheet, cash flow statement, projected budget, and monthly cash flow statement

F. Resources Required: Handouts

LECTURE OUTLINE

A. Course Title: Home Budgeting - WPL B. Lecture Number 1

- I. Set Goals
  - A. Future investments
  - B. Planning and prioritizing
    - 1. Necessary Investments
      - a. illness
      - b. emergency
      - c. death/burial plan
    - 2. Desire Investments
      - a. Retirement
      - b. Personal enjoyment

- II. Planning A Budget
  - A. Steps to preparing a budget
  - B. Home and personal planning

- III. Monthly Cash Flow
  - A. Income
  - B. Assets
  - C. Liabilities

WORKSHOP PLAN

A. Workshop Title: **HOME BUDGETING - WPL** B. Session 2

C. Topic: Basics of Recordkeeping

D. Prerequisite: Session 1

E. Activity: Students will set up recordkeeping information class. Complete information for next session.

F. Resources Required: Handout

LECTURE OUTLINE

A. Course Title: Home Budgeting - WPL B. Lecture Number 2

I. Basics of Recordkeeping
  A. How to find and collect important data
    1. Birth Certificate
    2. Social Security numbers
    3. Marriage Licenses
    4. Divorce Decrees
    5. Military discharge

  B. Other Documents of Importance
    1. Bill of sale
    2. Property documents
    3. Certificate of Deposit
    4. Wills
    5. Personal property inventory
    6. Saving certificates
    7. Income tax returns for six years

II. Financial Notebook
  A. Goal list
  B. Balance Sheet
  C. Record of important documents
  D. Credit card numbers
  E. Insurance information
  F. Pension benefits, social security information
  G. Acquisition or sale receipts of assets

III. Reserve Funds
  A. Emergencies
  B. Six month living expense fund

IV. Personal Budget
  A. Personal maintenance
  B. Personal entertainment

WORKSHOP PLAN

A. Workshop Title: **HOME BUDGETING - WPL** B. Session 3

C. Topic: Creating A Personal Budget

D. Prerequisite: Session 2

E. Activity Student will determine list of personal expenses, household expenses, and put into budget form

F. Resources Required: Handout

LECTURE OUTLINE

A. Course Title: Home Budgeting - WPL B. Lecture Number 3

- I. Creating Home Budget
  - A. Actual expenses
  - B. Set up budget sheet
- II. Short Term Plan
  - A. Determine goal
  - B. Determine objective
- III. Long Term Plan
  - A. Determine goal
  - B. Determine objective

HOME BUDGETING - WPL

CONCLUSION

- Instructors need to be interactive and directly involved with the students.
- Instructors need to promote active participation in class discussion by all students.
- Instructors need to use a variety of student-involved activities to stimulate interest.
- The classroom should have minimal distractions or intrusions.

Bibliography

Fullner, Wanda. A Money Management Workbook. Women's Financial Information Program. Consumer Affairs Section/Program Department; Women's Initiative, American Association of Retired Persons, Washington D.C. 1988.

McKenna, Judy and Makela, Carole J. It's Your Money Series. Cooperative Extension Service, Colorado State University, Ft. Collins, Co.

Morrow, Alice Mills. Family Financial Record Book. Cooperative Extension Service,Colorado State University, Ft. Collins, Co.

McKenna, Judy. Service in Action Pamphlets:
Credit - How Much Can You Afford?, 1981
Credit - Having It When You Need It., 1981
Credit - Women Need It., 1988
Your Credit File., 1981, Cooperative Extension Service, Colorado State University, Ft. Collins, Co.

HANDOUTS

SESSION I

PROJECTED BUDGET DATE:____________

For the Period __________ TO __________

Income	Planned	Actual
Salaries/Bonuses		
Investment Income		
Interest & Dividends		
Capital Gains		
Rent		
Social Security		
Pension		
Sales		
Other		
Total Income		
Expenses		
Savings/Investments		
Property Tax		
Income Taxes		
Insurance/car, house, life, health		
Mortgage/Rent		
Pension Payment		
Utilities		
Loan Payments		
Credit Card Payments		
Child Care		
Transportation/Gas, Upkeep		
Medical Expenses		
Education/Supplies		
Clothes		
Grocery Store Supplies		
Gifts		
Recreation		
Holidays/Vacations		
Publications		
Contributions		
Eating Out		
Union/Professional Expenses		
Club Dues		
Pocket Money		
Other		
Total Expenses		

SESSION II

CASH FLOW STATEMENT DATE:__________________

	Monthly			Yearly		
Income	Self	Spouse	Total	Self	Spouse	Total
Salaries/Bonuses						
Investment Income						
Interest & Dividends						
Capital Gains						
Rent						
Social Security						
Pension						
Sales						
Other						
Total Income						
Expenses						
Savings/Investments						
Property Tax						
Income Taxes						
Insurance/car, house, life, health						
Mortgage/Rent						
Pension Payment						
Utilities						
Loan Payments						
Credit Card Payments						
Child Care						
Transportation/Gas, Upkeep						
Medical Expenses						
Education/Supplies						
Clothing						
Grocery Store Supplies						
Gifts						
Recreation						
Holidays/Vacations						
Publications						
Contributions						
Eating Out						
Union/Professional Expenses						
Club Dues						
Pocket Money/Incidentals						
Other						
Total Expenses						

DATE:____________________

PERSONAL PROPERTY INVENTORY

Purchase Date	Description of Item	Model #	Serial #	Cost

SESSION III

		BALANCE SHEET	DATE:	
	Current Value			
1. Assets	Type of Ownership	Self	Spouse	Total
Checking Accounts				
Savings Accounts				
Brokerage Accounts				
Money Market Accounts				
CD's				
IRA				
Keogh Accounts				
Pension/Retirement Accts.				
Life Insurance				
Annuities (cash value)				
Bonds (Gov. Corp.)				
Mutual Funds				
Stocks				
Securities				
Receivables				
House				
Other Real Estate				
Car				
Personal Property				
Antiques				
Jewelry				
	Total Assets			
2. Liabilities				
House Mortgage				
Other Mortgages				
equity/loans				
Auto Loans				
Credit Cards				
Installment Accts.				
Contracts/Loans				
Income Taxes				
Pledges				
Other				
	Total Liabilities			
	Total Assets, Minus Liabilities			
	Net Worth			

SERVICE
IN ACTION
COLORADO STATE UNIVERSITY EXTENSION SERVICE

Credit—having it when you need it

Judy McKenna[1]

no. 9.139

Quick Facts

Credit is one tool in a financial management package.

In order to establish a good credit rating, consumers must understand and meet credit terms, pay back obligations as agreed, contact creditors if a payment must be missed, and correct billing errors.

Some of the advantages of using credit are that young people often have greater needs than income and credit is a way to make large purchases; by borrowing to buy an item, people will have the use of it before they own it; sometimes an emergency makes it necessary to borrow to pay expenses.

Disadvantages of using credit include overspending and adding finance charges to the price of goods and services; also, easy credit drives up the demand for goods and services and subsequently prices.

Establishing a credit history showing credit worthiness before it is needed will speed the credit process.

Young consumers and women should establish credit histories.

The Equal Credit Opportunity Act and Fair Credit Reporting Act were passed to provide protection against the arbitrary denial of credit.

Credit should be considered as one tool in a financial management package. Credit can expand buying power and simplify recordkeeping; however, if purchases are not related to income and payments are missed, the result is a poor credit history. In some cases use of too much credit may lead to bankruptcy.

The name of the game is building a good credit record. Steps should be taken to establish a credit rating before credit is needed. In order to establish a good credit record consumers must understand and meet credit terms, pay back obligations as agreed, contact creditors if a payment must be missed, and correct billing errors through correspondence with the company.

Advantages of Using Credit

People frequently say, "All we hear are the problems with credit. Aren't there advantages to using credit?" Pluses associated with credit include the following:

Young people often have greater needs than income. Credit may be the way to make large purchases such as a home, education, furniture and appliances.

By borrowing to buy an item, people will have the use of it before they own it. A good example is an automobile—few people can afford to pay cash and yet this is considered an essential purchase for most people.

Sometimes the only way to cope with an emergency is to borrow to pay expenses, especially when emergency medical care is needed or unemployment reduces income.

Credit can be used for investments. A house is important for shelter and in recent years has been an excellent investment. Most people usually do not have cash for a home.

Credit allows people to enjoy conveniences today. Some families find washing clothes at home rather than at a laundromat a real time saver. A loan may provide an opportunity to add a second bathroom to a home with a growing family.

For people who find it difficult to save for purchases, credit payments may be considered a form of forced savings.

There are tax advantages for borrowers. Interest is tax deductible for those who itemize expenses.

Disadvantages of Using Credit

Common credit problems can be avoided. These are some of the disadvantages of using credit:

Consumers may overspend. One-third of all U.S. households have bank credit cards and 70% of those who use cards generally pay only the minimum payment. We have the tendency to spend more money when we charge items compared to paying cash. Researchers concerned with department store purchases found that the average cash sale was $8.25, the average store credit card was $15.93, and the average bank card sale was $20.47. Many people have

---

[1] *Judy McKenna, CSU extension specialist, family resource management (7/1/81)*

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. Lowell Watts, Director of Extension Service, Colorado State University, Fort Collins, Colorado 80523. By law and purpose, the CSU Cooperative Extension Service is dedicated to serve all people on an equal and nondiscriminatory basis.

To simplify technical terminology, trade names of products and equipment occasionally will be used. No endorsement of products named is intended nor is criticism implied of products not mentioned.

Credit has been relatively easy to get and consumers have found themselves adding loan on top of loan to their outstanding debt.

Finance charges add to the price of goods and services, although many people don't consider this. They don't realize what a large portion of an already tight income is going to pay monthly interest charges.

Qualifying for Credit

Whether credit is needed to make a purchase or to pay for an emergency, it often is needed right away. Having an already established credit history showing credit worthiness will speed the credit process.

Ability to pay is measured by net income and assets, including a home and bank account, and stability including time at current job and address.

Companies use various methods to determine if they will provide a person with credit. Some companies have developed their own credit scoring systems where they assign points to applicant characteristics. They will probably consider how long you have held your present job, the number of years you have lived in your present home, and whether you have borrowed money. No single item is important by itself, but total points will determine if your application is approved.

Credit for Young Consumers

People without credit histories may have difficulty getting credit when they need it. In particular, young people have found credit availability and opportunities for favorable credit terms out of reach because they have not established credit records showing credit worthiness.

Credit laws protect consumers from unreasonable denial of credit, but it still takes effort on the part of these consumers to establish a good credit record.

Credit for Women

Every woman should establish a credit history. See Service in Action sheet 9.146, *Credit—women need it* for more information.

Protection for Credit Applicants

Two laws passed in the 1970s provide protection against the arbitrary denial of credit encountered by women, minority and senior citizens. The Equal Credit Opportunity Act made it illegal to deny credit for reasons such as: "divorced women are not good credit risks," "your wife will probably quit work to have a baby so we'll just count part of her salary," "women can't handle money and credit." The Fair Credit Reporting Act gave everyone the right to know the contents of their credit files and to correct errors.

Equal Credit Opportunity Act. In 1975, this law was passed to prevent discrimination against credit applicants. The Act was passed in two stages. The first stage went into effect in October, 1975 and made it illegal to deny anyone credit based on sex or marital status. In March, 1977, race, national origin, age and receipt of public assistance were added to the list.

Recently, a court decided that a mortgage company discriminated against an engaged couple by turning them down for a mortgage loan on the basis that they weren't married. The court ruled that there was no greater claim to mortgage payments from a married couple than from an unmarried couple and that the company had violated the Equal Credit Opportunity Act.

Here are some of your protections under the Equal Credit Opportunity Act:

- A creditor must not discourage you from applying for credit.
- A creditor may not ask your marital status if you apply for a separate, unsecured account such as a bank or department store credit card. A creditor may, however, ask whether you are married, unmarried, or separated if you apply for a joint account or an account secured by property. A creditor may not ask whether you are divorced or widowed.
- A creditor may ask for information about your spouse only in the following situations: 1) your spouse is applying with you, 2) your spouse will be allowed to use your account, 3) you are relying on your spouse's income or on alimony or child support income from a former spouse. If you rely on alimony, child support or separate maintenance payments to get credit, you will need to inform the creditor of this. But you do not need to mention these sources of income, if you have other sources of income on which to base your credit application.
- If is illegal to ask about your plans for having or raising children.
- A creditor may not require you to reapply, change the terms of your account, or close your account because you change your marital status, reach a certain age or retire.
- When considering your credit history, accounts that you hold or use jointly with a spouse must be included.
- Reliable income from alimony, child support, separate maintenance payments and from public assistance must be considered in the same manner as other income.

When you apply for credit, you have the right to know whether your application was accepted or rejected within 30 days. If the application was rejected, you have the right to know why. The creditor may either give you the reason right away or inform you that you have the right to know specific reasons that you must then request within 60 days. Examples of specific reasons are "income was too low," "haven't been employed at your job long enough." Unacceptable reasons are: "didn't meet our minimum standards," "didn't receive enough points on our credit scoring system."

If you receive a notice that your credit application was denied because of a credit report, you have the right to know what your credit report said that caused your application to be denied. If you ask to see your credit file within 30 days after you have been notified, the credit bureau cannot charge you a fee for reviewing it.

Fair Credit Reporting Act. You have the right to know what is in your credit file, and if there are errors, to have them corrected. You may wish to see your credit report even though you have not been denied credit. The credit bureau will schedule a time to go over your credit report with you. You will be charged a small fee by the credit bureau.

Establishing a Credit History

Availability of credit is based on three factors. The amount of credit available in the marketplace, the individual's ability to pay (salary or other income), and the willingness to pay (your credit history). No one is automatically entitled to credit and this is why a good credit history is important.

Here are some suggestions for establishing a credit history:

- Apply for a credit card from a bank or department store. If you have no source of income, apply for credit at a small, independent shop. You may not get credit from all small shops but many will want your business.
- Take out a small loan to pay for a purchase or simply take out the loan, deposit the money in a savings account and pay the account back in payments.
- Arrange to buy an appliance or furniture with a consumer loan.
- Ask that a jointly held account be changed to your name.
- If you change your name, be sure to inform all of your creditors and the local credit bureau.
- Don't forget, take the time to check your credit file. If you are married, contact creditors who have records in your spouse's name alone and request that the credit be reported in your name, too.

Now is the time to establish credit in your own name. Don't wait until you need it.

SERVICE IN ACTION
COLORADO STATE UNIVERSITY EXTENSION SERVICE

Your credit file

Judy McKenna[1]

no. 9.141

Quick Facts

A person's ability to borrow money depends on the availability of money, previous willingness to borrow money and history of fulfilling credit obligations.

The Fair Credit Reporting Act gives consumers a number of protections concerning their credit reports.

Consumers who find that there is incomplete or outdated information or a mistake in their credit file should correct it immediately.

A person's credit history follows wherever he or she lives; there are five major automated credit reporting firms in the United States who hold files on 95 percent of those who use credit.

Persons should check their individual credit reports periodically to make sure they agree with the information, and to correct any mistakes or file their side of the story if there is a dispute.

"NO, I WILL NOT ASK HIM ABOUT HIS CREDIT RATING ON OUR FIRST DATE!"

A person's ability to borrow money depends on the availability of money, previous willingness to borrow money and history of fulfilling credit obligations. (See Service in Action sheet 9.139, *Credit—having it when you need it.*) A person often feels hurt after being turned down for a loan and says, "I'm a great credit risk, I pay cash for everything." Those who do pay cash have no history or proof to indicate the type of risk they would be, therefore, lenders may take longer to decide to grant credit or may turn down the loan application. If you establish a credit history early, you will have already done the necessary qualifying footwork that will greatly simplify a credit application when you need it.

If you have established several credit accounts, how do you know what your credit record looks like? Frequently, people don't know what their credit history says until they are turned down for credit. Denial may be for a variety of reasons such as not employed long enough or new to the area, or you may not get a loan because of some piece of information reported from your credit file. Because of a federal law, you have the right to know what your credit report says about you.

Credit Report Rights

Until 1971, consumers did not have an opportunity to see their credit reports and were not able to correct information or add statements telling their side of a credit dispute.

In 1971, Congress enacted the Fair Credit Reporting Act giving consumers a number of protections. The purpose of this law is to make sure that credit reporting agencies conduct their business with fairness, accuracy and respect for your right to privacy. It protects you from the burden of a credit history that could be based on incorrect or incomplete information. Here are some highlights:

- Consumers should be given specific reasons if they are denied credit. No longer can you be turned down because you "didn't meet our credit standards."
- If you are refused credit, or if you are suddenly dropped as a credit customer, your creditor must tell you if the decision was based on information received from a credit reporting agency and must tell you the name and address of that agency. You have the right to review, free of charge, what the information in your credit file says about you. You may either go in person or request a summary of the report by mail. You will not be charged if you contact the credit bureau within 30 days of being turned down for credit.
- The error must be corrected if the information is incorrect. If the information is disputed, you may file a

---

[1] *Judy McKenna, CSU extension specialist, family resource management (7/1/81)*

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. Lowell Watts, Director of Extension Service, Colorado State University, Fort Collins, Colorado 80523. By law and purpose, the CSU Cooperative Extension Service is dedicated to serve all people on an equal and nondiscriminatory basis.

To simplify technical terminology, trade names of products and equipment occasionally will be used. No endorsement of products named is intended nor is criticism implied of products not mentioned.

statement telling your side of the story. Your statement must accompany any future requests for credit information about you.

- You have the right to see your credit file even if you have not been denied credit. You should expect to pay a small fee for this. It is advisable to call the credit bureau, explain that you want to go over your credit history and ask about a convenient time to come in. If the credit bureau will not respond to your request to see your credit file, contact the Federal Trade Commission, Suite 2900, 1405 Curtis Street, Denver, Colo. 80202; phone: (303) 837-2271.

Jointly Held Credit Accounts

A relatively new addition to the Equal Credit Opportunity Act states that all accounts opened in joint names after June 1, 1977, will be reported in both names. However, joint accounts that were opened prior to that date, may still be reported only in the husband's name.

Here is a sample letter that can be sent to creditors requesting that information be released in both names:

Under the Equal Credit Opportunity Act, I request that you report all credit information on this account in both our names.

Account number

(Name) First Middle Last

(Name) First Middle Last

(Street)

(City, State, Zip)

(Signature)

from a Federal Trade Commission publication)

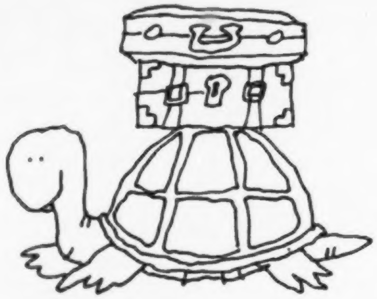
Although the credit bureau has this information stored, they will not, unless directed by the creditor, report it for both names. That is why it is important to contact each creditor and request that this information be released by the credit bureau for both credit histories.

The credit bureau does not give a rating to a credit user, this is done by the business that issues credit. The credit bureau merely stores and reports the information upon request from those who subscribe to the credit bureau's services.

Errors in Credit Reports

If you find that there is incomplete or outdated information or a mistake in your credit file, you should correct it immediately. If it is a reporting error from the lender, contact the lender and try to get the error corrected. If this doesn't work, send a letter with copies to the Federal Trade Commission and the credit bureau. Some credit bureaus may help you resolve this problem. Be sure and enter a statement in your credit file explaining your side of the story.

Your Credit History Follows You



People who think they can escape a poor credit history by moving to another state find their credit history following right behind. There are five major automated credit reporting firms in the United States who hold files on 95 percent of those who use credit. Within seconds a credit report can be transferred from Miami to Denver.

Credit bureaus do not rate your use of credit or recommend whether credit should be extended or denied, they simply report the information given them by previous lenders. Files are coded on a scale of zero to nine. "Zero" means a new account with no rating. "One" means pays on time, "two" means pays somewhat slow and so on up to "nine," which means goods have been repossessed.

Information is kept for seven years. After seven years it is no longer reported. Bankruptcy is the exception and it is left in the record for ten years.

If you plan to move you should notify the credit bureau. If you are moving within Colorado, request that your credit file be forwarded to your new destination. If you are moving out of state, wait until you get to the new area and contact that credit bureau. Tell them that you would like to have your credit history sent to your new place of residence.

Credit Responsibility

Your credit file is your biography to lenders. If you pay your obligations within the agreed time and contact creditors if you have temporary problems, your story will encourage other lenders to grant you credit.

Errors do occur and the only person who can correct them is you. Check your credit report periodically to make sure you agree with the information. If you are turned down for credit, find out why. If the information is false, get it changed. If the problem is a dispute between you and the lender, include a letter in the file that explains your position.

A good credit history is nice to have when you want it and essential when you need it.